The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXV. No. 650 December 12, 1931 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0

Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

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Steady and Strong

IT is impossible for the chemical industry to remain unmoved during the intensive discussion of the position and prospects of the iron and steel trades. The metallurgical side of the industry is deeply interested in the maintenance of one of the greatest of the stable trades of Great Britain in a state of progressive efficiency, and the alarm which is shown at its recent contraction is not only natural but justifiable. Iron and steel manufacturers find themselves in an exceptionally difficult position in the face of continental competition which, however, it is regarded, is far from normal. On the one hand, the production of British steel has been steadily declining since 1929; on the other hand, during the month of October, imports of steel represented 61 per cent. of home production, or nearly twice the rate obtaining in 1929.

Exceptional remedies have to be applied to exceptional diseases, and it is good news that the National Government propose to undertake a thorough examination of the iron and steel position during the short parliamentary recess. The position is, unfortunately, more complicated than might be gathered from the aggresive campaign for immediate import duties which has been carried on in the last few weeks. Anyone with a sense of responsibility and a spark of imagination can see that this is not a matter which Mr. Runciman can take in his stride after the manner of his orders for the restriction of imported manufactures sent to Great Britain with the object of forestalling a tariff. Iron and steel are at the root of the entire fiscal economy of these islands. They raise in a very acute form the interpretation of the term "raw material." That strong measures may have to be taken to deal with the present emergency is not in dispute, but a hasty decision may easily do more harm than good. Those interested in the iron and steel trades have only to reflect on the Government's difficulties with the milling trade over the proposed wheat quota, to recognise the justice of Mr. Runciman's claim for hard thinking and a cautious approach towards an equally vital problem.

No government ever had a clearer mandate than the present one. It was elected by a national and therefore non-party vote to restore the balance of trade. There is universal agreement that it has begun the most formidable task ever entrusted to a British administration not only promptly and effectively, but with that spirit of instinctive moderation for which British statesmanship is deservedly famous. The British manufacturer has only to look abroad to appreciate the steadying influence which the Government has brought to bear on the financial and economic concerns of this country. Notwithstanding the suspension of the gold standard, Great Britain remains one of the two or three stable units in a world almost submerged in economic chaos. There are no fewer than twenty-three countries, chiefly on the continent of Europe, in which government restrictions have been imposed upon exchange transactions. The difficulties of the German situation have been illustrated afresh by an emergency decree which must be unique in the history of a great nation. Not only are fixed prices of commodities drastically cut, but deductions are peremptorily decreed in railway freight rates, postal rates, and in the charges for such public services as gas, water, and electricity. More revolutionary than any of these measures is a compulsory reduction of the interest rate on all fixed interest-bearing securities. These astonishing emergency provisions have only to be recited in bare outline to recall a sense of proportion to those who are conducting an aggresive propaganda for any and every scheme for government interference with British industry. Nobody in these islands wants to see established an economic dictatorship of the kind which has been imposed upon Germany. The National Government is entitled to demand the implicit confidence of the whole body of citizens in carrying out a national policy of reconstruction on principles approved by its collective wisdom.

There can be no greater mistake at the present time than to imagine that any government can bring about the industrial millenium. That is, to fall into the vicious error which brought the last Government to irretrievable disaster. Its unhappy experience should have proved conclusively to every intelligent observer that Acts of Parliament were incapable of establishing a social millenium. What governments can do is to avoid mistakes and re-establish confidence, and that is what Mr. MacDonald and his colleagues have so far attempted with a large measure of success. The National Government is pre-eminently important for the feeling of permanent stability which it engenders. There must be no weakening of what is probably the only available instrument for national reconstruction on sound lines. The outer world is in a state of such depression as to give the British people legitimate cause for pride that they have installed a National Government which for steadiness and strength is the envy of harassed peoples elsewhere.

A Gesture by the I.C.I.

SIR HARRY MCGOWAN'S Christmas message to the staff of Imperial Chemical Industries is a generous gesture in harmony with the traditions of that great corporation. Assistance on the instalment plan is to be given to those workers who may require it in meeting their income-tax demands on January 1. Anybody who has the slightest contact with business knows the very real hardship imposed upon the lower grades of salary and wage-earners by the new income-tax provisions which Lord Snowden found himself forced to include in his emergency Budget. Many thousands of men and women who have never been assessed to income-tax before are now called upon for a direct contribution to the national revenue. Even those who have in previous years been subject to income-tax are faced with a very much larger demand for the first instalment during January. Their difficulties have been aggravated by the inevitably late period at which they received their assessments. Nothing could better illustrate the excellent relations which have lately arisen between employers and employed than the decision of the leaders of the chemical industry to remove a considerable part of the actual hardship from the shoulders of the lower-paid grades. It is an example which has already been followed by employers in other industries. National advantage should accrue, inasmuch as the spreading over a period of several weeks of income-tax payments will enable the employees of I.C.I. to make more or less normal purchases at the biggest spending season of the year. The Christmas trade which was threatened with serious contraction may yet provide its proper quota towards the restoration of prosperity, which is the most urgent national need.

Manufacture of Vitamin D.

THE news that vitamin D is now being manufactured in this country in pure crystalline form is ample evidence of the alertness of the British chemical manufacturer. It is only just over six weeks since Dr. Bourdillon and his colleagues, at the National Institute for Medical Research, made the announcement that they had been successful in isolating this highly active substance from the irradiation product of ergosterol, which proved to be a mixture of the pure vitamin and an inactive impurity. Calciferol, the pure vitamin D, is a modest-looking white crystalline powder, but it is approximately 400,000 times as active as cod liver oil which, ten years ago was considered to be the most efficient form of vitamin D obtainable. As we are told that one gram of calciferol is equivalent in activity to half-a-ton of cod liver oil, the price is distinctly cheap at £6 per gram. Already the manufacturers are accumulating a stock sufficiently large to meet the requirements of research workers in medical science.

Books Received

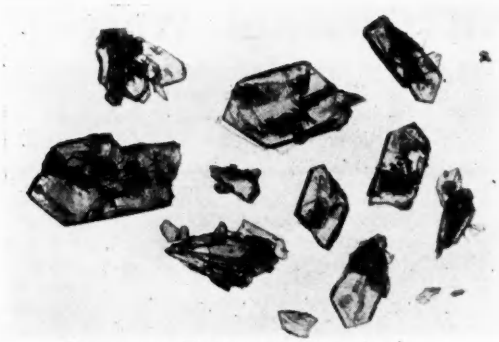
REPORT ON THE ECONOMIC CONDITIONS IN PERU, August, 1931. By W. M. Gurney. Department of Overseas Trade. London: H.M. Stationery Office. Pp. 91. 2s. 6d.

FARADAY AND HIS METALLURGICAL RESEARCHES. By Sir Robert A. Hadfield. London: Chapman and Hall, Ltd. Pp. 330. 21s.

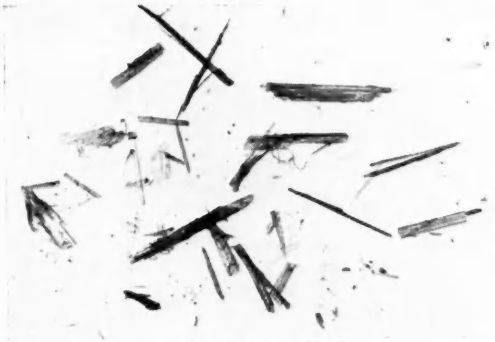
ANALYTICAL CHEMISTRY. By John C. Ware. London: Chapman and Hall, Ltd. Pp. 462. 22s. 3d.

The Calendar

December 12	North of England Institute of Mining and Mechanical Engineers. 2.30 p.m.	Newcastle-upon-Tyne.
14	Institute of Metals (Scottish Section): "New Alloys in the Brass Foundry." J. Arnott. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
14	Society of Chemical Industry (Yorkshire Section): "Heat Insulation and its Measurement." "High Temperature Insulators." T. H. Blakeley, J. W. Cobb; "Low Temperature Insulators." N. H. Chamberlain. 7 p.m.	Royal Victoria Hotel, Sheffield.
15	Society of Dyers and Colourists (London Section): "Dyestuffs and their manufacture." J. Blair. 8 p.m.	Modern School Luton
15	Royal Photographic Society. 7 p.m.	35, Russell Square, London.
15	Society of Chemical Industry and Institute of Chemistry (Edinburgh Sections): "Soil Micro-organisms." D. Ward Cutler. 7.30 p.m.	Pharmaceutical Hall, 36, York Place, Edinburgh.
16	Society of Glass Technology. 2 p.m.	Leeds.
17	Chemical Society: Discussion on "The Critical Increment of Homogeneous Reactions," opened by C. N. Hinshelwood, Professor A. J. Allmand, E. J. Bowen, and Professor E. K. Rideal. 8 p.m.	Burlington House, London.
17	Exhibition of Modern Technical and Artistic Glasses: "Stained and Painted Glass." James Hogan. 4.45 p.m.	Science Museum, London.
18	Institute of Chemistry. Third S. M. Gluckstein Memorial Lecture. "The Chemist and the Community." Sir Frank E. Smith. 8 p.m.	30, Russell Square, London.
18	Society of Dyers and Colourists: "Specifying and Matching nearly-white colours by the Blancometer." J. B. Charters. 7.15 p.m.	George Hotel, Glasgow.
18	Society of Chemical Industry: "A Cynic Surveys Chemical Progress." R. MacLaurin. 7.30 p.m.	Royal Technical College, Glasgow.
18	Society of Dyers and Colourists (London Section): "The Treatment of Leather in Dyeing and Cleaning." C. L. Bird.	



CALCIFEROL DINITROBENZOATE (x10).



CALCIFEROL (x10).

Crystalline Vitamin D

Preparation of Pure Product on a Commercial Scale

THE recent announcement that vitamin D has been prepared in pure crystalline form is not merely of academic interest, for here in London at the works of British Drug Houses, Ltd., the manufacture of this remarkable product is now being carried out on a commercial scale. British research workers and chemists have also played a most distinguished part in the long series of discoveries which have culminated in this achievement.

In his presidential address to the Royal Society, Sir Frederick Gowland Hopkins devoted some of his remarks to this subject. He told us that the constituent of animal and vegetable matter which is converted into the antirachitic vitamin D by ultra-violet irradiation was really identified some four years ago by Rosenheim and Webster, working at the National Institute for Medical Research at Hampstead. This substance was ergosterol. Dr. R. B. Bourdillon and his colleagues at the National Institute, other workers in Holland, and Professor Windaus at Göttingen, have all subsequently turned their attention to the task of preparing the vitamins in crystalline form. Working by independent methods they have succeeded in obtaining products of varying grades of purity which have since proved to be mixtures of calciferol (the pure active vitamin D) with pyrocalciferol (an inactive impurity present to the extent of 30 to 40 per cent.). It was in *Nature*, October 31, that Dr. Bourdillon and his colleagues first announced that they had been able to effect the separation of these two substances by preparing 3 : 5-dinitrobenzoyl esters from the irradiation mixture, and within one month, we are informed, the process was put into practice on a commercial scale.

Irradiation of Ergosterol

At the works of British Drug Houses, Ltd., we have this time vitamin D in course of manufacture starting from the irradiation of ergosterol. Special precautions have to be taken to prevent oxidation during the process, but the final product is stable unless exposed to light carrying ultra-violet rays or to heat. Calciferol dinitrobenzoate forms yellow crystals; calciferol, itself, is a white crystalline substance melting between 116° and 117° C. At present the vitamin is selling for about £6 per gram, which is only just over 15 grains, but this single gram is almost equivalent in activity to half-a-ton of cod liver oil, which would normally cost ten times as much. Calciferol in its pure crystalline form, indeed, has an activity of 40,000 units per milligram, whereas cod liver oil has an average activity of only 0.1 unit per milligram. Considered in this light the price of the new product is remarkably cheap in terms of the performance which may be expected of it. Cod liver oil, moreover, is very variable in its vitamin content, depending upon the relative concentration of vitamin in the original livers from which the oil is extracted. It is therefore a remarkable achievement to be able to produce this highly active substance in a form which will be invariable in respect of its activity for medicinal purposes, and in a crystalline form which can be characterised by melting point, specific rotation and absorption spectra.

Ultra-violet light, natural or artificial, can activate ergosterol whether it be present in food or in the fat under the skin. The exact nature of the change which takes place on activation has not yet been discovered; but, coincident with the chemical change represented by the acquirement of vitamin D activity, the physical properties of the ergosterol are also altered. Previous to the discovery that ergosterol on exposure to ultra-violet light gave vitamin D, workers at the Lister Institute discovered that rats although fed on a rickets-producing diet did not develop rickets when the cages in which they were kept contained saw-dust which had previously been exposed to ultra-violet light. Rats on a similar diet and in similar cages with saw-dust which had not been irradiated developed rickets. This result could not be explained until it was discovered that the rats had eaten of the irradiated saw-dust. It was concluded, therefore, that the antirachitic effect had been produced by the action of the ultra-violet light upon the fatty constituents of the saw-dust.

At the time of the above-mentioned discovery the antirachitic effects of ultra-violet light were being studied in the British Drug Houses laboratories; and within a very short time, standardised activated ergosterol (under the name Radiostol) was first made available in unlimited quantities.

The accompanying photomicrographs are the first to be published relating to these products.

Oil from Coal

Its Relation to National Needs

IN examining the commercial possibilities of producing oil from coal in Britain, the December issue of the Chamber of Commerce Journal, organ of the London Chamber of Commerce, states that interest in the question may be intensified by the urgent need for balancing our trade account and by the renewed hope of British industrial recovery. Attention is drawn to the claim of Imperial Chemical Industries, Ltd., that the experience of the hydrogenation process with a semi-commercial plant at Billingham, which has converted some 15 tons of coal daily into about nine tons of high quality petrol, is sufficient to warrant the construction of a large-scale commercial unit capable of producing over 200,000 tons (or more than 60,000,000 gallons) of petrol a year.

While admitting that in a free market the synthetic production of oil could not compete equally with the natural product, the Journal maintains that there is in existence at present a set of circumstances which may justify the large-scale production of oil from British coal in the near future. "To begin with, Great Britain, like almost all other countries, is not a free market for petrol and oil; secondly, it is faced with an urgent need to alleviate unemployment; thirdly, its national defence must rely on some source of home production in case of emergency. It is claimed that the large-scale plant already mentioned would give permanent and direct employment to about 5,000 men, of whom 3,000 would be miners, and about 850,000 tons of coal would be used annually, of which some 400,000 tons would actually be hydrogenated.

The Disposal of Industrial Chemical Waste

By E. B. Besselievre

The safe disposal of industrial chemical wastes was the subject of a paper read at a recent meeting of the United States National Safety Council. The author is a sanitary engineer to The Dorr Co.

INDUSTRIAL wastes are discharged in three general forms: solids, gases, liquids. Each of these has its definite effect on the health and comfort of those resident nearby. There is a fourth sub-class of wastes that are chiefly liquid, but carry a certain proportion of solids, both components being deleterious in different ways. It is best to take each one of these classes separately and consider the sources and components, and their effect. Solid wastes are usually the scraps remaining from the process work in the plant, or by-products of the plant. Some are thrown out in solid form and remain stable, the problem of their final disposal being a place to put them out of sight. Combustible wastes in the solid form may be readily burned in municipal or private refuse incinerators. Some solid wastes, such as saw mill refuse, may readily be used as fuel. Wastes of this type may also be suitably disposed of by dumping in low spots and covering the dump with earth.

Decomposable Wastes are Dangerous

Wastes of a solid nature, that are in themselves decomposable or contain certain decomposable elements, are a far more serious problem and require different handling. If such wastes are allowed to lie around in uncovered piles, they will soon cause obnoxious odours and arouse complaints and causes of civil action. Organic solid wastes may be adequately disposed of in some instances by putting them in closed receptacles and allowing them to undergo their natural process of decomposition. Under certain circumstances, such solid wastes in the process of this digestion produce a large volume of gas. This gas has a high calorific value and may be utilised in producing power or used as fuel under boilers, etc.

Solid wastes, such as slag from furnaces, scraps of iron and other metal, tailings from metallurgical operations, may be disposed of as fill. If this is done sensibly, low, swampy places may be reclaimed and be the source of considerable revenue for factory sites. Judicious piling of this material to a height consistent with the surrounding ground elevation will neither cause obstructions to traffic nor be obnoxious to the eye, and, on the other hand, may open up new avenues of approach to land developments, thus saving time for those who reside or work in the vicinity. A noteworthy example of this type of disposal of a solid waste is at the plant of the Martin Dennis Co., at Kearney, N.J., where, by means of a system of industrial railways, they have reclaimed a number of acres of swamp land adjacent to their plant, thus making for themselves and their neighbours much more presentable surroundings, reducing mosquito nuisance and adding valuable building areas.

The indiscriminate piling of waste serves no useful purpose. The huge piles of waste phosphate rock in Florida, the tailings piles at the copper mines, the waste piles at Syracuse, N.Y., are mute evidence of misplaced disposal. There is low and waste land in the vicinity of any of these places that could be restored to useful and productive purpose by careful and studied dumping. Health officials can have no jurisdiction over such affairs, but municipial authorities can logically exercise some measure of control over these waste dumps.

Gaseous Wastes

Gaseous wastes are usually the result of processes involving combustion, either of fuels for power and heating purposes, or for roasting of ores, smelting of metals, gas manufacturing, acid manufacturing plants, incinerators and the like. In many of them the gases thrown off are visible, being coloured the familiar yellow of sulphur, black when soft coal is used, and the white ash-laden smoke of an incinerator improperly operated. Municipal refuse incinerators are in many cases notorious performers in the discharge of smoke carrying odours of unconsumed garbage, many small particles of ash which settle in a pall over the countryside and constitute a fire menace, as well as a menace to comfort and health. Where the incinerators are one of a recognised group, this is due entirely to faulty operation. Experience has proved that when the furnaces of municipal garbage and refuse incinerators are kept at a heat of between 1,200° and 1,400° F., perfect combustion of the refuse will result, there will be no smoke, no odours and no powdery ash. Allowing the heat to drop below the danger point of 1,200° is due to carelessness, insufficient combustible material to maintain the heat or lack of care in the mixture of garbage and rubbish.

All gaseous wastes may be readily controlled. Frequently a check-up in the plant itself will disclose leaks, and sloppy operations, which, when corrected, will modify the trouble to a marked degree. Odour-destroying devices have been developed and are in successful use. Washing of gases and fumes will frequently suffice to remove solids in suspension in the gas. A number of successful plants are now functioning where plain settling tanks have been employed to recover flue dust, and several types of scrubbers are in use in gas plants that will reduce the odour nuisance. The use of chlorine has been found effective in a number of cases in preventing stack odours. Usually, a scrubbing or washing operation will remove sufficient of any suspended matter in the smoke or gas to eradicate the cause for complaint.

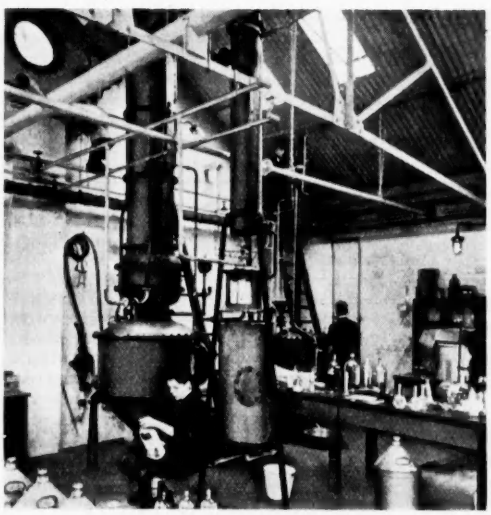
Troublesome Nature of Liquid Wastes

Liquid wastes are, of the three main types, the worst to handle; they are greatest in number and present the greatest problems to the engineer and chemist. Because the nearest stream is usually the means of disposal first considered, the pollution is immediately transmitted to an innumerable body of innocent humans and animals who either depend upon these streams for their source of potable water, or for industrial purposes or for watering stock. Liquid wastes are usually large in volume and contain a great array of materials which may be classed as pollutants. Some of these elements are in suspension, some in solution and vary in colour and concentration. It is not necessary that the large volume of water usually discharged from industrial plants be diverted from the stream because of pollution, but, rather, it is essential that the pollution be removed. Large volumes of water taken from a stream and used in the various industrial plants that line its banks should logically be returned to that stream after use. The common law says that it must be in the same volume and condition. An example of this policy of diverting water from a stream was evident in New Jersey until recent years. The large textile mills at Passaic, Paterson and the other towns along this river required enormous volumes of water each day, one plant alone taking 15 millions of gallons each day, enough water to satisfy an ordinary city of 150,000 people for its normal uses. The total reduction of the river flow through the pipe line used by these textile mills was so great that, except at flood times, when the dam overflowed, the river bed ran almost dry and was a sore sight, being the recipient of all manner of debris. Regulation of this by requiring the users to return a certain proportion of the water used to the river has again resulted in the Passaic being classable as a river.

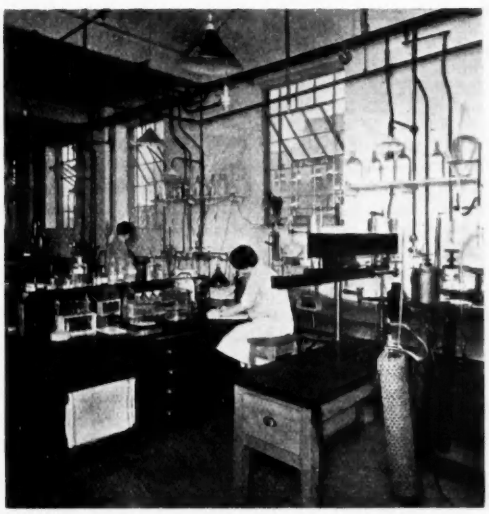
Water as a Disposable Agent

It is true that in many plants a large volume of water is used in cooling and other purposes which may not entail contamination. This water can be, and usually is, discharged directly to the stream, if found to be safe. On the other hand, it is sometimes more economical to treat wastes which are highly charged with pollutants than a highly concentrated waste, and in a number of instances it has been found advantageous to combine some of this clear water with the wastes, in order to obtain the reaction that an alkaline water will produce on an acid waste. This method may in certain cases save considerable money. For instance, where colour removal is the chief problem, and as in dye manufacturing wastes or textile plants, it is difficult and expensive to remove the last trace of colour by chemical means, the lighter shades

THE RAT ROOM FOR OBSERVING THE ANTIRACHITIC ACTIVITY OF VITAMIN D.



THE SOLVENT RECOVERY PLANT.



ONE OF THE ANALYTICAL LABORATORIES.

A Glimpse inside the Works of British Drug Houses Ltd.

AT THESE WORKS VITAMIN D IN PURE CRYSTALLINE FORM IS NOW BEING PRODUCED ON A COMMERCIAL SCALE, BY THE IRRADIATION OF ERGOSTEROL AND SUBSEQUENT SEPARATION OF THE DINITROBENZOYL ESTERS. BIOLOGICAL TESTS FOR STANDARDISATION PURPOSES ARE CARRIED OUT ON RATS.

of colour may be entirely dissipated in a large volume of clear water, so that the resultant discharge to the stream is safe and unnoticed. To overlook this is perhaps to cause an unwarranted burden of expense.

Many liquid wastes are menaces to health because of their content of organic solids. These settle out in the stream, and, due to their avidity for oxygen, soon make the stream odorous and destroy the use of the water for potable purposes. Where there is a definite concentration of particular industries in a given locality, splendid results may be obtained by the provision of a common fund, by the members of the industry, to finance the experimental work necessary to develop a successful and economical method of treatment for the wastes of a given industry. Co-operation of these groups with state health officials is usual, and it is a wise move, as it serves not only to forestall action, but to call the attention of the state to the problem and to keep them posted as to the efforts of the polluters to find a remedy.

The Economic Aspect

The tanneries of Pennsylvania, in combination with the State Water Board, have done a noteworthy piece of work in investigating the treatment of wastes from tanneries located on small streams. The coke manufacturers, due to the intensified pollution caused by the phenols in their wastes, have spent large sums in endeavouring to find means of relieving this trouble. Processes of adsorption and evoporation have been the result. The paper and paper pulp manufacturers, who have a problem of large volumes containing high percentages of waste fibre and sulphite liquors, have been working for years under intelligent guidance and in harmony with the officials of Michigan and Wisconsin, and have had marked success. The meat packers have also done a great deal of work in Chicago, Fort Worth and other places to develop a means of handling their wastes. In one instance this has resulted in the development of a method of treatment which shows a considerable annual profit in the recovery of valuable by-products and their use as hog feed and fertiliser. More and more of this concerted action will undoubtedly be done and eventually all large industrial organisations will be brought to see the advantages of research properly conducted.

Success in waste treatment is only a success when it is economical. Many times it has been found that wastes could be treated to reduce the colour or the suspense to a minimum, but that when all the figures were cast up, it would be business suicide for the plant owner to attempt to carry out the treatment. That is why intelligent investigation of a problem is so important.

Eliminating the Smoke Nuisance

A NEW combustion control apparatus is finding popularity in Scottish establishments. Not only does the apparatus eliminate smoke from factory chimneys, but it gives more efficient combustion, resulting in considerable fuel saving. The system has had several years of research given to it and has resulted in considerable success on the Continent. It is the invention of an Austrian engineer, but the British patent rights have been acquired by Combustion Control, Ltd., which is a British company. In principle, the apparatus comprises a novel system of small steam jets which emanate from one small nozzle introduced just within the furnace above the firing door. These jets are operated by a control valve on the boiler front. The nozzles are so bored that they give the jets a different directional downward flow of steam over the grate, the jet system being so designed as to cause a violent turbulence within the furnace. The secondary air enters the furnace through a specially designed firing door, and this door not only allows the amount of air to be regulated easily but also deflects the air downwards so as to bring it under the direct influence of the steam jet system. The air is thus prevented from rising and is impelled forward over the fuel, where it is thoroughly mixed with the volatiles, due to turbulence created by the steam jet system. The mixture is then projected forward and downward over the incandescent part of the furnace, where all of the gases are completely burned. This apparatus can be applied to any type of steam boiler without necessitating structural alterations. Smoke is abolished, evaporation is increased, and coal consumption decreased to such an extent that the installation quickly pays for itself.

Society of Public Analysts

Elections to Membership

AN ordinary meeting of the Society was held at the Chemical Society's Rooms, Burlington House, on Wednesday, December 2, the President, Dr. J. T. Dunn, being in the Chair.

Certificates were read for the first time in favour of Albert Green, M.C., M.Sc., Ph.D., F.I.C., John Farrar Hardwick, B.Sc., A.I.C., Ernest Stephen Hawkins, B.Sc., A.R.C.S., F.I.C., Joseph Robert Johnson, F.I.C., M.Inst.M.M., Arthur Pillans Laurie, M.A., D.Sc., F.R.S.E., and John Morgan Tucker, B.Sc., A.I.C. Certificates were read for the second time in favour of Thomas Whittaker Lovett and William Charles Alfred Wise, B.Sc.

The following were elected Members of the Society:—Charles Hubert Francis Fuller, B.Sc., F.I.C., Ganesh Chandra Moitra, B.Sc., Eric Charles Wood, B.Sc., A.R.C.S., and Robinson Pearson Wood.

Abstracts of Papers

A micro-method for the determination of uronic anyhdride groups in pectic substances was the subject of a paper by H. W. Buston. In the apparatus devised by the author for distillation with dilute hydrochloric acid and measurement of the resulting carbon dioxide, the internal volume of the apparatus has been kept as small as practicable, to facilitate complete removal of the carbon dioxide by the current of air. The process is complete in 60 to 70 minutes, and the results are as accurate as those given by the macro process.

In his paper on the composition of linseed oil, N. E. Cocchinaras, from the results of bromination experiments concludes that the linolenic acid of linseed oil is present in only one isomeric form, namely that yielding the crystalline hexabromide. Less than 2 per cent. of oleic acid was found, and the solid fatty acids were proved by fractional distillation to consist only of palmitic and stearic acid.

The calcium fluoride method for the determination of fluoride, with special reference to the analysis of nickel plating solutions, was discussed by S. G. Clarke and W. N. Bradshaw, in the presence of an excess of calcium chloride to reduce the solubility of the precipitate, calcium can be quantitatively precipitated as calcium fluoride without simultaneous precipitation of calcium carbonate. Iron does not interfere if it is first reduced to the ferrous condition by means of hydrazine, and the adsorption of calcium sulphate is largely prevented by the presence of ammonium chloride, which increases the solubility of the calcium sulphate.

A further paper on oil from Malayan *Aleurites Montana* and the properties of Hong Kong oil was read by T. Hedley Barry.

Fertilisers in South Africa

Exploitation of New Phosphate Deposits

THE discovery of large fields of high-grade phosphate of lime at Palabora in North-Eastern Transvaal is expected to result in the development of an extensive South African fertiliser industry, for this deposit has yielded samples of much higher value than obtained from any other South African field. The South African Phosphates, Ltd., has been floated with a capital of £54,156 in 10s. shares, and has an option over a block of 1,730 claims. The adjoining 270 claims are held by the Craib Syndicate, which will probaly work on much the same lines as the larger company. South African Phosphates, Ltd., has erected much of its plant, but as the trade extends the capital of the company will probably be increased and a much larger factory erected. The company intends to enter the market on competitive terms. Its products will be made up as far as possible in grades equal to those of imported fertilisers, but the retail price to farmers will be very much lower. It is hardly possible to arrive at any reliable estimate of the phosphate resources of this district, but they are computed to run into millions of tons, the bulk of which can be mined under inexpensive methods. It is anticipated that in the near future Palabora will supply all South Africa's phosphate needs, and the more optimistic are looking to the day when an export trade will be built up in active competition with such countries as North America, Egypt, Tunis, Morocco and Algeria.

Chemical Trade in South Africa

[FROM A CORRESPONDENT.]

WITH most other British export lines, the chemical trade in South Africa has benefited by the decision of the South African Government to remain on the gold standard, but it may suffer a slight setback at the intention to impose a 5 per cent. *ad valorem* duty on all imports. In spite of the keen criticism, the measure is in many quarters regarded as justified, especially if it is only enforced until the present difficult period is tided over.

Power Alcohol

The Orange Free State has now interested itself in the distillation of high-grade power alcohol and other by-products from maize, and it is reported that a local company will shortly erect a distillery at Bethlehem. At least £350,000 will be invested in various ways, and the annual wages bill is expected to be about £20,000. About 100 Europeans and 100 natives will be employed. The name of the company and the extent of its capital has yet to be revealed, but it is believed to have overseas backing and the support of the South African Government. The distillery will be erected on a large area of ground. It is also understood that a similar distillery will be erected at Lindley.

Starch and Cornflour

The new Maize Quota Act is expected to have an adverse effect on the Transvaal starch and cornflour industry. Before this Act was passed, such manufacturers could obtain raw materials at about the same price as competitors in Europe, and thus they were able to sell their products at a lower price than the imported. Cornflour and starch from overseas had to be reduced several pence per pound on account of South African competition, but as the price for the raw material has gone up by about 3s. 6d. per cwt. the price of the South African product may also have to be increased. Other interests have also been hit by the Act, but there is little likelihood of it being repealed.

Salt Industry

In an attempt to stabilise the South African salt industry, producers have formed themselves into an association, which is to remain in operation for the next five years. During this period members of the association bind themselves to dispose of their salt and other products only to the association, which will regulate the amount of salt to be supplied by each producer and the quantity needed to meet current demands. To discourage infringement of the rules of the association, a heavy scale of penalties has been drawn up. For every ton of salt sold to any body other than the association a fine of £5 is imposed, with an additional penalty of £50 for each offence.

Canning and Wine Making

Another important development is the meat canning factory to be erected at Okahandja, in South-West Africa, where Leibigs have for some time had a beef extract plant. A trained meat canning expert is in residence at Okahandja, where he will supervise the equipping of the factory and take charge of the work once the factory is established. Simultaneously, the Wine Growers' Association, at Paarl, has been trying to manufacture a non-alcoholic grape juice for use in cafes and restaurants, and following the employment of a German expert, it is now reported that successful experiments have been concluded. Most of the samples previously produced fermented much too rapidly, and such was the result even when expensive experts were employed. The new drink does not suffer from this disadvantage. It is described as refreshing and nourishing, and remarkably pleasing to the taste.

Insecticides

A new factory has been opened in Durban to manufacture the chemical products invented by Mr. T. J. Boyce. The main product will be an insecticide marketed under the trade mark of "Insectine," which is claimed to be non-poisonous to human beings, as it contains no harmful components. The oils of which it is made will not stain, but to all insect life, and especially mosquitos, they are fatal. At a test made in several hotels it was found that cockroaches were killed soon after spraying, and that the eggs of mosquitos were also destroyed. Another point in favour of this fluid is that it can be used as an antiseptic and deodorant in the sick room. The factory is also producing distemper cures, worm specifics and skin ointments made up to Mr. Boyce's formulæ. Cattle medicines are also being produced. Many chemical compounds of this sort are being manufactured in South Africa, but large use is still made of the imported product, and even with the competition of the new Durban factory, it is hardly likely that the import trade will suffer seriously.

Soap Manufacture

On a small scale soap has been manufactured in South Africa for scores of years, but the first commercial venture was made in 1890 by Mr. F. Ginsberg, who established a factory at Kingwilliamstown. Soon after Anderson's soap factory was opened in Natal. The New Transvaal Chemical Co. still later began work in Johannesburg, but the most important development was when Lever Bros. established factories in Durban and Cape Town. To-day the Union has 25 soap and candle factories, employing about 1,800 workers and having an output valued at over £1,900,000, but there still remains scope for the British exporter. Most of the soap manufactured in South Africa is of the household and laundry type, the annual value of which is £1,065,000. Over £210,000 of toilet and other sorts of soap are produced annually and nearly £50,000 of scouring soap. In normal times the annual import of soap is worth about £110,000. The South African male still prefers shaving soaps, creams and powders from overseas, and many of the ladies prefer British or French toilet soaps. The local factories may never capture this trade.

Red Lead for Paint

Comparison of British and American Standards

IT is claimed, with justification, that for the protection of iron and steel structures against corrosion one of the best methods is the use of red lead paint. The manufacture of this product can now be controlled with great accuracy, the process consisting in oxidising molten lead at about 645° F. with air, to yellowish lead monoxide (PbO) and then oxidising the latter still further at not over 1,000° F. to red lead triplumbic tetroxide (Pb_3O_4). There is always, however, some free lead monoxide present depending upon the methods adopted, and different qualities of red lead are made according to the particular application for which they are intended. This matter is important for the manufacture of "non-setting" red lead paint, which will keep without "setting" or becoming hard when stored in containers.

The latest British Engineering Standards Association Specification for non-setting red lead, adopted January, 1929 (No. 315), specifies that there must be present a total of 99.5 per cent. oxides of lead, and that the red lead (Pb_3O_4) content shall not be under 93.15 per cent. "Non-setting" red lead for paint contains approximately 93.15 per cent. red lead, 6.35 per cent. lead monoxide, and not more than 0.5 per cent. other material, which includes a loss of not more than 0.2 per cent. on heating in a steam jacketed oven at 203-208° F. Matter soluble in water should not exceed 0.03 per cent. With reference to "non-setting" properties it is specified that such red lead, on grinding with refined linseed oil to a paste containing 8-10 per cent. oil, and being further thinned to paint consistency with the same oil, shall remain after 14 days' exposure to the air in such a condition that simple stirring with a paddle shall render the mixture suitable for paint.

The latest United States standard red lead specifications issued by the American Society for Testing Materials, tentatively adopted in 1921, amended in 1924, and finally issued in 1930, are concerned with two standard varieties. The first is the ordinary product, known as the "85 per cent. grade," which must contain not less than 85 per cent. Pb_3O_4, which is of the "setting" variety with linseed oil, and not intended for paint to be kept for long periods. The other is the special non-setting "95 per cent. grade" containing 95 per cent. Pb_3O_4, and also 4.0 per cent. lead monoxide, PbO, with 1.0 per cent. total impurities allowed, including moisture and total matter soluble both in water and a mixture of nitric acid and hydrogen peroxide.

A Question of Secret Process

Injunction Sought by Chemical Company

MR. JUSTICE BENNETT, in the Chancery Division, continued on Wednesday, December 9, the hearing of an action brought by United Indigo and Chemical Co., Ltd., Union Buildings, Chapel Walks, Manchester, against Mr. William Robinson, Prospect Works, Farsley, near Leeds, for an injunction to restrain defendant from using or disclosing information alleged to be wrongfully obtained, or alternatively disclosing any secret confidential information acquired by him in the service of plaintiffs, relating to plaintiffs' specialities of trade processes, prices, names of customers or other details, and an injunction to restrain defendant from attempting to make use of any copies of extracts from any of the plaintiffs' books, also delivering of all documents in defendant's possession belonging the plaintiffs, and copies of any extracts.

Defence was a denial that the plaintiffs' product was made by a secret process, and defendant denied having made any unauthorised extracts from plaintiffs' books, and that in the manufacture of his own products he had done no wrongful act.

Manufacture of Boiler Scale Preparations

Mr. H. Grant, K.C., for plaintiffs, said that they were chemical manufacturers, and one of their products was called Algaloid, for the purpose of removing scale, or other deposit, from the inside of boilers or pipes. There was a large market for this product, which plaintiffs had made for 30 years. The process was discovered at plaintiffs' works. In May, 1922, defendant, who was then 21 years of age, entered the employ of the plaintiffs at the Leeds Colour Works, Reuben Street, and he was initiated into the secret process of making Algaloid. Defendant was a Fellow of the Chemical Society, but it was alleged had no degree. There were in Algaloid certain chemical substances, and a vegetable product from India—a particular kind of cutch, which produced the best results. A certain exact temperature and cooling process was also needed. All this, claimed counsel, meant a secret process, which could only be known by experience and teaching in the plaintiffs' works, or by experiments, which might take a considerable time. One chemist might find the key to the process in an early stage of the investigations, but another man might take a considerable time. In chemistry, of course, nothing was secret in the end to the scientific magician. During the 30 years, however, during which Algaloid had been made nobody else had produced it, nor was there any information in any chemistry book, which would lead to the secret.

In 1926, defendant was promoted to the post of manager of this part of the works, and he had access to all the formulæ. He knew by his training the exact methods of the practical work. Defendant, said counsel, was the only person to whom the knowledge was imparted. Defendant later gave plaintiffs notice and left the employ on November 30, 1929. Defendant, alleged counsel, explained that he was leaving to assist in a liaison business in Sevenoaks.

It was subsequently found that he had a small works built at Farsley, where he had been making experiments, and preparing to be plaintiffs' competitors. Plaintiffs found that he was selling a substance called Descalit, which was the same thing as Algaloid. It was incredible for defendant to deny that this was the result of the confidential information he gained, while in the employ of plaintiffs. It was necessary for the success of the manufacture, that the substance should be of an invariable quality.

His Lordship, intervening: You cannot stop a man using something, which by the course of his employment becomes part of himself.

Counsel: Subject to limitation; if it is imparted confidentially.

His Lordship: Would that mean that at the time the information was disclosed, he was told it was confidential?

Counsel: I do not think it necessary he should be told, if it followed from the way the knowledge is obtained that it is secret.

Mr. Swan, for defence, said that there was no allegation that Mr. Robinson had ever disclosed the information to any other person, nor had any evidence been called to show that he intended to do so. There was no restrictive covenant to restrain defendant on leaving the employ to put into practice the ordinary knowledge gained as a chemist for the purpose of earning his livelihood. The substances used were elementary, and in quantities, which any person of ordinary intelligence could carry in his head without the slightest difficulty.

Mr. Robinson, giving evidence, said that he was in business as the Leeds and Bradford Chemical Co. He manufactured Textisol, Descalit, waterproof products, and a variety of addments. He was 30 years of age, and had been engaged in the chemical industry for 10 years. He began his education at the Sevenoaks Grammar School, and later passed the London Matriculation Examination in chemistry and physics. When he entered plaintiffs' employ there were no formulæ books, and all the processes of manufacture at the works were of the simplest description. Witness said that he had done experimental work at Leeds University chemical laboratory.

A costing book was begun at the works during his service, and it was necessary to refer to it occasionally for the purpose of plaintiffs' business.

Counsel: It is suggested that you took away with you, when you left plaintiffs' service in 1929, notes or extracts or memoranda, which you had made from the costing book?

Witness: It is untrue.

Witness said that Descalit was made by a more modified and improved method than Algaloid.

Witness denied that he had ever taken the costing book from plaintiffs' work.

Judgment

Mr. Justice Bennett in judgment said that he did not believe that defendant had taken any secrets from the books except so far as it was necessary for defendant to make notes from the costing book from time to time for the purpose of giving information to directors. His Lordship came to the conclusion that defendant did not take away from plaintiffs' works, when he left the employment, any copies from the costing formulæ or any other book which plaintiffs kept during the time the defendant was in their employment. The plaintiffs were not entitled to restrain defendant from using knowledge he had acquired and could not help acquiring in connection with the manufacture of Algaloid. There was no secret as to the material from which it was made. Plaintiffs' own expert witness said that there was no secret in regard to it. Any analytical chemist could without difficulty ascertain the materials from which the substance was composed, and the secrecy, if there was any, consisted in the way in which the material was manipulated during manufacture. It consisted, according to plaintiffs' expert witness, in the way in which the soda ash was put into the tannin mixture, and the temperature employed in the various stages of manufacture, also as to the manner of testing its consistency. When defendant entered plaintiffs' employ he was not told that he was going to be put into possession of secret knowledge. Without any difficulty defendant was able to ascertain the exact quantities of the elements used. It was impossible in justice to a servant to restrain him, when he leaves his masters' service from using information which he could not help but acquire. The knowledge defendant possessed was honestly acquired and his Lordship said it would not be right to imply into a contract of service that a servant should not use knowledge honestly come by. The action would therefore be dismissed with costs.

National Safety Week, 1932

THE National Safety First Association have decided to hold a series of Safety Weeks in 1932 rather than one National Week. National Safety Week has grown so rapidly that it is now more than the Association can handle in any one week, in consequence of which the experiment is to be tried of running separate safety weeks in the different localities at different times. There are now some fifty local Safety First Branches in the principal centres throughout the country, and these will be asked to organise a local safety week in their area; local authorities will also be approached to assist. Safety Week in the London area has been fixed for May 2-8. This will coincide with the National Safety Congress which will be held in London during that period.

Beet Sugar Factory Wastes

Purification Practice at Poppleton

A Second Supplementary Report upon the Purification of Waste Waters from Beet Sugar Factories, with special reference to the Poppleton Factory, has been issued by the West Riding of Yorkshire Rivers Board. This report, which is by Mr. J. H. Garner, chief inspector to the Board, and Mr. J. M. Wishart, assistant chemist, relates to purification practice as carried out during the 1929-30 and 1930-31 campaigns, and is of interest, not only to those engaged in the manufacture of beet sugar but also to those who have to deal with large volumes of waste water which contains similar putriscible matter.

IN the first report it was specially emphasised that the pollution problems which confronted the beet sugar industry might best be solved in conjunction with alterations and improvements in factory design and process work, rather than by directly striving to purify—unremuneratively—large volumes of refuse. Reference was also made to the disadvantages of mixing the various waste liquids and treating them together, separate treatment of beet washing water, process water and lime sludge being recommended. It is therefore interesting to note that, since that time, the general trend in respect of purification processes at other factories has been in the direction indicated in this previous Report

Source of Waste Waters

The beet sugar factory at Poppleton has now been in operation for five seasons, during which period the efficiency of the factory has been greatly increased. Great improvements have gradually been made in the arrangements for dealing with the waste waters, and, in spite of the large valumes of waste produced, there has so far been no material pollution of the River Ouse. The factory was originally designed to deal with 1,000 tons of beets per day, but during the last two campaigns this figure has been exceeded. In the 1926-27 campaign the average weight of beets used per day was 595 tons; in 1927-28, it was 771 tons; 1928-29, 781 tons; 1929-30, 1,020 tons; and in 1930-31, 1,421 tons. The effluent originates from the water used for transporting beets from the silos to the factory, and from washing beets inside the factory. There is no "process water," as the Raabe continuous diffusion process is used for extracting the juice from the sliced beets, and the pulp press water is returned to the diffusion apparatus. The waste lime sludge from the purification of the juice by the carbonation process is pumped to separate lagoons, from which there is no effluent, and from which the air-dried lime is periodically removed.

The beets are delivered at the factory either by rail or road, and are stored in long concrete silos, having a capacity of 10,000 tons of beets. The floors of these silos slope to centre channels or "flumes," covered with lengths of wood grids, the flumes from all the silos being connected to a main flume, leading to the washing machine inside the factory. The beets are thus conveyed from the silos to the factory by water carriage, the water having previously been used for condensing purposes, the good grids over the flumes being removed in turn so that the beets can be pushed into the flumes and floated into the factory. During this conveying process, the beets are partially washed, and washing waters flow to a pump well, from which they are pumped by two 12 inch vertical spindle "unchokeable" pumps to the treatment plant. These waste waters contain soil from the roots, beet rootlets and leaves, colloidal matter from soil and beets, and a little organic matter in solution. The bulk of the impurities consists of suspended matters—inorganic soil particles and organic vegetable debris—varying in amount according to the kind of soil in which the beets have been grown and the conditions under which they have been harvested.

Arrangements for Dealing with Waste

The arrangements for dealing with the waste waters at Poppleton comprise (a) grit chambers, with elevators for the removal of readily settleable sand and grit; (b) screening apparatus for the removal of leaves and rootlets; and (c) large settling pond sub-divided by banks into four sections for use in series. The average amount of soil, etc., removed from the beets in the washing process during the 1929-30 campaign was 16.42 lb. per cwt., or 14.66 per cent. Owing to the dry harvesting season, this figure is considerably less than that for the previous campaign, when the figure of 16 per cent. was considered normal. The volume of unfiltered river water used was 227,700,000 gallons, and the volume of filtered water was 10,464,000 gallons, making a total of 238,164,000 gallons, or an average of 4,493,660 gallons for the 53 days.

The bulk of the unfiltered water, after having been used for condensing purposes, is used for conveying the beets from the silos. The conveying water, together with the water from the washing machine, was pumped for treatment through the grit chamber, screen and settling ponds. The bulk of the floor washing water from the evaporation and centrifuging departments, which often contains an appreciable amount of sugar from the overflowing of tanks, was also put back into process, and not allowed to run to waste as during former campaigns. The grit chamber and screen together removed about 3,710 tons of sand, soil, beet tailings, etc.; all this material was tipped on land adjacent to the factory. The amount of lime filter press cake produced in the first carbonation process was 6,000 tons, and in the second carbonation process 250 tons, making a total of 6,250 tons (50 per cent. moisture). This material, after having been thinned with a little water, was pumped to the lime sludge lagoon, from which there was no effluent. The average total daily volume of waste water which flowed through the settling ponds was 4,209,660 gallons.

Lime Kiln Waste as a Precipitant

Lime was again used as a precipitant during the 1929-1930 campaign. Kiln waste, containing about 65 per cent. of lime (CaO), was added by manual labour at the inlet to the settling pond, at the rate of one ton per day for the first fourteen days of the campaign. This amount was equivalent to approximately five parts lime per 100,000. By the end of the first fortnight the effluent from the final settling pond showed signs of becoming septic, and the addition of lime was therefor discontinued with the object of checking the septicity. After a period of about two and a half weeks all signs of septic action had gone, and lime was then added at the reduced rate of half a ton every other day. Although the final effluent was of a rather more polluting nature than during the previous campaign, only once was there any noticeable effect on the River Ouse. On this occasion the "dissolved oxygen absorbed in five days" (Royal Commission test) by the river water at Clifton Ferry—about three-quarters of a mile below the effluent outfall—was 0.21 parts per 100,000, as against a value of 0.09 parts per 100,000 absorbed by the river water above the factory.

It was found by experiments on samples of final effluent that only 34.3 per cent. of the suspended matter settled after standing for 24 hours, leaving 65.7 per cent. of very fine solid matter still in suspension. This fine solid matter was precipitated by the addition of alumino-ferric. Experiments showed that the addition of 10 to 15 parts per 100,000 of alumino-ferric to samples of refuse entering the ponds produced, after 24 hours' settlement, a clear, colourless, supernatant liquid, containing no suspended matter. It was thought that less alumino-ferric would be required for clarification if it were added to the waste waters after the bulk of the heavy solids had been settled—say, at the overflow between the second and third ponds—but this was not confirmed by later experiments. If anything, better clarification was obtained by adding the alumino-ferric without previous removal of the heavy solids.

When lime was used as a precipitant for the beet washing waters at the Poppleton factory, there was a noticeable tendency for the liquid in the final settling pond to become septic. This septic condition gradually disappeared when the addition of lime was discontinued. The mean temperature of the four ponds was between 80° F. and 90° F. at the beginning of the campaign, and became rather less as the weather became colder in winter.

Chemical Industry in India

Re-organisation Receiving Attention of Government

THE manufacturing of heavy chemicals in India is considered to be a matter of national importance. To assist it to expand on a more economic basis, the Indian Tariff Board have therefore been investigating the manufacture of sulphuric acid and its derivatives, with a view to recommending to the Government tariff protection for the industry.

Sulphuric, hydrochloric and nitric acids—due to the natural high protection afforded them by heavy sea freights, which are amounting to as much as £5 per ton—are manufactured with profit on a small scale in India, but the salts dependent upon the acids have not enjoyed the same natural protection, so it has proved difficult for the Indian manufacturer to compete against imports from other countries in which the industry is highly developed. The present market (excluding Burma) in terms of sulphuric acid is approximately 12,000 tons, and should in a few years reach at least 16,000 tons. It is. therefore, deemed sufficiently large for the production of chemicals on an economic scale. The machinery required for manufacture, which is simple in operation, could be easily handled by Indian labour, while fuel, an important item, is abundant and cheap.

In the matter of raw materials, although India possesses several of those required, sulphur, which is the most important, is at present lacking; but in this respect she is at no disadvantage compared with Great Britain and Germany.

Production of Sulphuric Acid

The present scale of manufacturing is carried on in small units with low production, so that before there can be much hope of a future for the industry the whole structure will require re-organisation. It has been estimated that with one manufacturing unit attaining an average annual production of 4,000 tons in terms of chamber acid of 100 per cent. strength, and of other chemicals in such quantities of each as to absorb the whole available market for that chemical, a fair selling price for chamber acid would be Rs.75 per ton, which, compared with current import prices, would necessitate no substantial addition in revenue duties except in the case of Epsom salts and zinc chloride, while in many cases duties on a considerably lower scale would suffice, and on certain of the acids and copper as no protection would be necessary.

Were the manufacturing units to attain an annual output of 8,000 tons of chamber acid—for which it is believed that in a few years there would be a market in Western India alone—a fair selling price of acid would be Rs. 55 per ton, which it is stated compares favourably with the price of sulphuric acid of the same strength in other parts of the world. If the industry should develop along these lines, those investigating it are of the opinion that no protection will be necessary, while with economies in operation, and increased output, costs of production could be lowered.

Owing to the close connection existing between the chemical industries and the manufacture of ammonium sulphate and superphosphate, the fostering of their manufacture in India has been considered.

The Question of Tariff Duties

The Government of India state that, after giving careful consideration to the many recommendations made by the Tariff Boards, they find themselves confronted by certain difficulties, and realise that the present organisation of the chemical industry in India is unsatisfactory. In their opinion the imposition of such duties as proposed by the Board will not in itself lead to the development of the industry on healthy lines, but will be more likely to perpetuate its existing uneconomic organisation.

As to encouraging the manufacture in India of superphosphates by bounties, such action would undoubtedly be of assistance in raising the production of the country towards an economic level: but the Government do not consider that they would be justified in putting the Board's proposal into immediate operation, as the industry is not yet in existence. Furthermore, it has by no means been ascertained that superphosphate represents the best or the most economic form in which Indian soil deficiency in phosphates can be corrected, and before reaching a final decision on this subject the question will have to be further examined.

Trade with South America

Progress of "Industria Britanica"

IN introducing the Anti-Dumping Bill, Mr. Runciman stressed the vital importance of increasing British exports to assist in restoring the balance of trade. During the past six months THE CHEMICAL AGE has had remarkable proof of the opportunities awaiting British manufacturers, through its associated publication *Industria Britanica*. Great hopes were naturally entertained when this new journal for South America was launched with the personal support of the Prince of Wales, who welcomed it as a means of following up the British Exhibition at Buenos Aires. Now that five issues have appeared it is possible to judge the results of this enterprise, which is bringing enthusiastic opinions from readers by every mail.

The favourable atmosphere created by the Exhibition which was held in Buenos Aires last spring has been followed by a period of considerable depression in South America, yet in spite of this handicap there is ample evidence of new business being secured by British firms. The publicity afforded by *Industria Britanica* has already produced inquiries from importers throughout these Spanish markets interested in thirty classes of commodity, ranging from heavy engineering to foodstuffs and domestic requirements.

Facilities Offered to Exporters

Through *Industria Britanica* a manufacturer hears that there are possibilities in Colombia; he writes to the journal which in turn makes inquiries through its correspondent 9,000 miles from London. Two months later word arrives that a certain agent in Bogota is prepared to handle the business. Samples are dispatched, and with the aid of publicity, also arranged in London, a new market is opened up. It thus comes about that a British factory worker is making goods for use on the other side of the world, the whole transaction having been arranged through an editor in Fleet Street who provides the vital link in this extensive chain of business. As already announced in THE CHEMICAL AGE, the service provided includes a Translation Bureau, where correspondence is translated for advertisers who do not employ a South American, but naturally wish to correspond with the customer in his own language.

Prospective agents have also been introduced to several firms through *Industria Britanica*, which in association with the F.B.I. has resident correspondents in seventeen Spanish-speaking countries. The value of this facility is obvious, since it is now possible to seek agents in any part of South America, with the knowledge that only reliable parties will be recommended. In the same way, references can also be secured through the journal, thus minimising the risks attaching to credit, etc., in these distant markets. Another facility in South American trade is the fact that British-owned banks operate throughout the continent, thus affording further confidence to the British exporter. The banks, indeed, are giving enthusiastic support to *Industria Britanica*, realising the value of publicity in assisting the development of trade on which their success depends. Prior to 1931 the United States was spending over seven times as much as Great Britain on advertising in South America, but our manufacturers now have the opportunity of flying the flag and thus restoring the supreme position they formerly held in what an authority has aptly termed the "most promising foreign market" for British goods.

Acetate Products Patent

THE report and accounts of Acetate and Acetate Products (Foreign Rights), Ltd., were unanimously adopted at the annual meeting held in London on Wednesday, December 10. Sir A. Cecil Tyrrell Beck, the chairman, said that the Cellulose Acetate Silk Co., which used their patents, had had a successful year considering existing conditions. They understood that that company was enlarging its plant. Negotiations had been carried out with the object of realising the company's processes, and the directors were doing everything to maintain the company's patents, while they had recently been granted a patent in Germany, which people considered of great importance. He honestly and genuinely believed that there was hope for the company if and when world conditions improved.

From Week to Week

THE LIBRARY OF THE CHEMICAL SOCIETY will be closed for the Christmas Holiday from 1 p.m. on Wednesday, December 23, until 10 a.m. on Tuesday, December 29.

THE LORDS COMMISSIONERS of H.M. Treasury have appointed Lord Melchett to be a trustee of the Imperial War Museum, in success to the late Sir William Orpen.

SIR WILLIAM BRAGG, F.R.S., Fullerian Professor of chemistry, will lecture on "The Universe of Light," on December 29 and 31, and January 2, 5, 7 and 9, at the Royal Institution, Albemarle Street, London, W.1., at 3 p.m. This is the 106th course of Christmas lectures adapted to a juvenile auditory.

AN ADDRESS on "Industrial Heat Treatment Furnaces" was given to members of the Society of Chemical Industry and the Institute of Metals at Armstrong College, Newcastle, last week, by Mr. J. T. Lowe, who described furnaces fired by various fuels for annealing, carbonising, hardening, normalising, patenting and tempering.

AT THE ORDINARY meeting of the Chemical Society on Thursday, December 17, a discussion on "The Critical Increment of Homogeneous Reactions" will be opened by Mr. C. N. Henshelwood, F.R.S., and continued by Professor A. J. Allmand, F.R.S., Mr. E. J. Bowen, and Professor E. K. Rideal, F.R.S.

ACCORDING to the *Frankfurter Zeitung* negotiations are about to be concluded for the acquisition by the Standard Oil Co., Indiana, of an interest in the Nitag (Naphtha Industrie und Tankanlagen A.G., Berlin). It is proposed that the Nitag shall increase its capital from Rm.2,550,000 to Rm.5,600,000, the new shares to be taken up by the American oil concern.

PROFESSOR G. T. MORGAN, F.R.S., president of the Society of Chemical Industry, visited Nottingham on Thursday, December 3, when he delivered a lecture on "The Chemistry of Low Temperature Tar," at University College. In extending the knowledge of the chemical nature of low temperature tar, Professor Morgan pointed out that methods of extraction have been adopted which avoid the use of distillation processes at high temperatures.

PROFESSOR W. E. GARNER, D.Sc., A.C.I., of Bristol University, gave a lecture on "Deteriorating Influences," at a meeting of the Bristol and South-west Counties Section of the Institute of Chemistry held in the University of Bristol last week. Dr. Garner dealt with the theoretical considerations involved in the exhaustive study of lead azide, mercuric fulminate and other compounds on which research work has been carried out, and is still proceeding, in the chemical department of the University.

AT THE END OF THIS YEAR Dr. Clay is resigning the Principalship of the Northern Polytechnic, a post he has occupied for twenty-nine years. The Governors, staff, students, and members of clubs and societies who have been associated with him during this long period wish to assist in offering some token of their regard and affection. A committee has therefore been set up to give effect to this general desire, the Hon. Treasurer of the Committee being W. M. Macbeth, Northern Polytechnic, Holloway, London, N.7.

INDUSTRIAL ACCIDENTS cost this country £25,000,000 a year, while six in every hundred industrial employees are injured annually. This was the statement made by Mr. R. J. Woods, safety officer at the Synthetic Works, Billingham, when he addressed the Teesside Industrial Safety Committee at Middlesbrough last week. Mr. Woods said there were nearly half a million accidents in industry yearly in this country, and of these about 3,000 proved fatal. Compensation paid in respect of industrial accidents amounted to more than £6,000,000 in 1928. It had been established, as a result of insurance company investigations, that the total cost of an accident to all concerned amounted to four times the amount of compensation paid. Mr. Arthur Dorman, of Dorman, Long and Co., who presided, said that since the formation of the Teesside Industrial Safety Committee there had been a lower rate of accidents for the district. Speaking for his own firm, the results had exceeded expectations.

MR. W. H. MILLS, M.A., of Jesus College, has been appointed reader in stereo-chemistry at Cambridge University.

DR. SAMUEL S. EVELAND, a New York research chemist, claims to have perfected a new cloth material which may revolutionise the textile industry. By his process Ramie grass (China grass) can be turned into a substance extremely similar to cotton.

IT IS REPORTED FROM DUBLIN that Professor Bayley-Butler, who is well-known in Irish scientific circles, has discovered a new clay suitable for the manufacture of gramophone records. The exact location of the deposit is unknown, but it is believed to be near Youghal, County Cork.

DR. EDWARD R. WEIDLEIN, Vice President of the Board of Trustees of Mellon Institute of Industrial Research and a director of that institution, has been elected a member of the Board of Trustees of the University of Pittsburgh for the period 1931-34. The Mellon Institute is, of course, allied co-operatively with the University of Pittsburgh.

SIR FRANK E. SMITH, F.R.S., will deliver the Third S. M. Gluckstein Memorial Lecture at the Institute of Chemistry, 30 Russell Square, London, W.C.1, on Friday December 18, at 8 p.m. His subject will be "The Chemist and the Community." Dr. G. C. Clayton, the President, will take the chair.

IT HAS BEEN DECIDED BY the Birmingham University Council to confer the title of Emeritus Professor upon Arthur Robert Ling, M.Sc., Adrian Brown Professor of Brewing and head of the Department of Malting and Brewing and the Biochemistry of Fermentation, 1920—1931. Professor Ling is a prominent member of the Birmingham and Midland Section of the Society of Chemical Industry.

AT THE ANNUAL GENERAL MEETING of the Irish Free State Section of the Institute of Chemistry held in Trinity College, Dublin, Professor W. E. Adeney presiding, the following Committee for the session 1931-32 was elected:—Professor W. E. Adeney, Dr. J. Bell, Mr. B. G. Fagan, Dr. A. G. Leonard, Dr. J. H. Millar, Professor A. O'Farrelly, and Mr. J. W. Parkes, Mr. George Brownlee and Mr. P. O'Callaghan were elected hon. auditors.

AT THE SECOND ANNUAL MEETING of Brownlac, Ltd., in London, on Monday, December 7, Lieut.-Col. G. A. M. Sceales said that since their last meeting the leasehold property at Twickenham had been realised. The Board hoped the company would be liquidated as soon as possible, and that sufficient would be recovered to make a substantial return to the shareholders. The report was adopted. At an extraordinary meeting a resolution to replace the present Board was defeated.

GLASS FROM THE SCIENTIFIC ASPECT was discussed by Mr. R. F. Taylor, chemist to Pilkington Brothers, Ltd., in a lecture to the Liverpool Section of the Society of Chemical Industry at the University, last week. After giving details of the manufacture of wired glass, he spoke of toughened glass, which gained its properties by sudden cooling. It was much stronger than ordinary glass, would withstand rapid changes in temperature, and was not broken by boiling water or molten lead. A piece the size of an ordinary motor windscreen would carry a weight of 25 stone. In an account of ultra-violet glass, Mr. Taylor showed that it was the elimination of ferric iron which made the glass transparent to ultra-violet rays.

Obituary

SIR DAVID BRUCE, F.R.S., in London, on Wednesday, November 25, aged 76. Major General Bruce rendered many eminent services in the cause of science, chiefly in regard to tropical diseases and methods for combating them. In 1903 he went to Uganda as director of the Royal Society's Commission for the investigation of sleeping sickness.

RECENT WILLS include:—Mr. Thomas Whinyates, of College Road, Great Crosby, formerly chief accountant of the United Alkali Co., Ltd., £1,888, (net personalty £1,832.) Mr. Paul George William Typke, of New Malden, Surrey, chemical manufacturer, founder of Typke and King, Ltd., of Mitcham Common, estate of the gross value of £39,431 (net personalty £19,671).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

335,017. PYRIDINE, QUINOLINE AND ACRIDINE DERIVATIVES. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, August 10, 1929

Pyridones, quinolones or isoquinolones whose nuclear nitrogen is linked with hydrogen or compounds containing the 2- or 4-oxypyridine nucleus are treated with a reactive ester of an amino alcohol, or may be first converted into the *n*-alkyl halogen derivative, which is treated with ammonia or an amine. The same *n*-aminoalkyl derivatives are obtained by converting compounds containing the 2- or 4-oxy-pyridine nucleus into the amino-alkoxy derivatives and isomerising by heat treatment. Other methods of preparation include the treatment of compounds containing a pyridine nucleus having a free 2- or 4-position with an amino-alcohol ester, and oxidation of the product, and treatment of a pyrone with an alkalene polyamine having at least one primary amine group. The products are therapeutic compounds, and a number of examples of the various methods of preparation are given.

355,019. RESINOUS PRODUCTS DERIVED FROM COAL OR CANNEL. A. McCulloch, Redcroft, Millbrook, Stalybridge, and A. Eccles, 108 Moss Lane, Hale, Cheshire. Application date, August 12, 1930.

Finely divided coal or cannel is chlorinated by passing dry chlorine through it, or dropping it through chloiine, or treating it in suspension in a liquid. The product is extracted by benzene, chloroform, acetone, ether, alcohol, or other suitable solvents, yielding products which are resinous in character and contain chlorine.

355,032. POLYMERISED VINYL NAPHTHALENES. Imperial Chemical Industries, Millbank, London. International Convention date, August 21, 1929.

Vinyl naphthalenes are polymerised by heating to 300° C. alone or in ethyl benzene in the presence of organic peroxides or metallic chlorides. Examples are given of the polymerisation of α-vinyl naphthalene under various conditions and with various catalysts. The products are employed for the production of moulding compositions, varnishes, and lacquers.

355,094. CAMPHENE. Schering-Kahlbaum Akt.-Ges., 170 Müllerstrasse, Berlin. International Convention date, October 22, 1929.

Pinene hydrochloride vapour which may be mixed with xylene vapour or water vapour is passed at 400°-500° C. over a surface catalyst or a metal salt, or a mixture. The catalyst may be silica gel, pumice, zeolites, such as "Frankonit," or "Tonsil," nickel, copper, copper phosphate or borate.

355,114. DYE INTERMEDIATES. W. W. Groves, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 28, 1930.

3 : 5-Dihydroxy-benzoic acid is heated with at least two molecular parts of an aromatic arylamine which may contain one or more halogen atoms, alkyl, or alkoxyl groups, in the presence of an acid condensing agent. The arylides obtained are saponified to obtain the acid. Examples are given of the condensation of 3 : 5-dihydroxy benzoic acid with aniline, to obtain 3-hydroxy-diphenylamine-5-carboxylic acid with 4-chloraniline to obtain 3-hydroxy-4¹-chloro-diphenylamine-5-carboxylic acid, and with 4-toluidine to obtain 3-hydroxy-4¹-methyldiphenylamine-5-carboxylic acid.

355,139. FATTY ACID DERIVATIVES. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 21, 1930. Addition to 339,675.

Products similar to those obtained in Specification No. 339,675 (see THE CHEMICAL AGE, Vol. xxiv, p. 148) are obtained by treating halogenated fatty acid amides having more than eight carbon atoms in the molecule and which may contain hydroxy groups and or double bonds, with solutions of ammonia in organic solvents. A tetrachlorinated derivative of oleic acid ethyl anilide obtained as described in Specification No. 336,623 (see THE CHEMICAL AGE, Vol. xxiii, p. 578) may be treated in this manner.

355,192. CATALYTIC OXIDATION OF ORGANIC COMPOUNDS. Selden Co., McCartney Street, Pittsburg, U.S.A. Assignees of A. O. Jaeger, 9 North Grandview Avenue, Crafton, Pa., U.S.A. International Convention date, February 13, 1929.

In the catalytic vapour phase oxidations of organic compounds in which oxygenated compounds are obtained, or in which organic impurities are removed by combustion, excessive oxidation is avoided by adding a difficultly oxidisable vapour such as carbon tetrachloride, anthraquinone, or suitable hydrocarbons. In an example, maleic or mesotartaric acid is obtained by oxidation of benzene, phenol furfurol or phthalic anhydride with a vanadium pentoxide catalyst the preparation of which is described. The same catalyst is used in purifying phenanthrene containing carbazole, with anthracene or ammonia as a protective agent. The mixture of phenanthrene and anthracene may then be separated. The catalyst may be a mixture of oxides of iron, cobalt, copper or nickel, and titanium, or may be silver vanadyl vanadate. Examples are also given of the preparation of benzaldehyde and benzoic acid from toluene, salicyl aldehyde and salicylic acid from cresol, halogen and nitrobenzaldehydes and benzoic acids from the corresponding toluenes, aldehydes and acids from xylene, pseudocumene, mesitylene and *p*-cymene, α-naphthoquinone from naphthalene, naphthalic anhydride from acenaphthene, fluorenone from fluorene, and many others.

355,208. ALCOHOLS, ALDEHYDES AND KETONES. H. Röhler, 47 Eisenbahnstrasse, Leipzic, Germany. International Convention date, February 16, 1929.

Vapours of lower alcohols are passed over a mixture of a hydrogenating or dehydrogenating metal and a dehydrating oxide or basic salt to obtain higher alcohols, aldehydes and ketones. The catalyst may be silver, copper, cobalt, iron or nickel, and oxide of aluminium, iron, thorium, tungsten or titanium. Single alcohols may be converted into alcohols having twice the number of carbon atoms and mixtures of alcohols into products with a number of carbon atoms equal to those in the starting materials, *e.g.*, 2-methyl--pentanol-1 from propyl alcohol, methyl-isobutyl-ketone and carbinol from isopropyl alcohol, methylpropyl ketone and methyl-isobutyl ketone and alcohols from a mixture of ethyl and isopropyl alcohols.

355,219. HYDROCARBONS. Ruhrchemie Akt.-Ges., Holten, Oberhausen, Germany. International Convention date, February 16, 1929.

Coke-oven gas, natural gas, waste gas from benzol synthesis, or gases from the catalytic conversion of mixtures of carbon monoxide and hydrogen, containing methane, ethylene, acetylene, etc., are treated with high frequency electric oscillations, which may be combined with or followed by a heat treatment over 900° C. The products depend upon the conditions of the electric treatment and the duration and temperature of the heat treatment. Gases having a high hydrogen content, and polymerisation products are obtained.

355,212-3. PHENOLS. Imperial Chemical Industries, Ltd., Millbank, London, W. R. Madel and E. W. Fawcett, Winnington Hall, Northwich, Cheshire. Application date, February 18,1930.

355,212. Crude petrol from the destructive hydrogenation of coal is distilled and the 170°-200° C. fraction cooled to −55° C. Two layers are formed, the upper containing a small, and the lower a large percentage of phenols. The layers are separated and treated for the recovery of phenol.

355,213. The mixture of phenols obtained as above is separated into its constituents by extraction with petroleum ether with the employment of low temperatures. Examples are given.

355,308. OXIDISED ORGANIC COMPOUNDS; ALDEHYDES; BENZOIC ACID. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 14, 1930.

Catalysts for the oxidation of carbon compounds by free oxygen consist of manganites of the heavy metals, earth

metals or rare earth metals, *e.g.*, of iron, cobalt, nickel, copper, zinc, and cadmium. Methane is oxidised to formaldehyde, alcohol to acetaldehyde, and toluene to a mixture of benzaldehyde and benzoic acid.

355,328. ARYLIDES OF AROMATIC HYDROXYCARBOXYLIC ACIDS. W. W. Groves, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 21, 1930. Addition to 336,428 (see THE CHEMICAL AGE, Vol. xxiii, p. 556).

m-Hydroxytolyl-arylamino carboxylic acids obtained as in Specification 352,644 (see THE CHEMICAL AGE, Vol. xxv, p. 409), are heated with arylamines in the presence of phosphorus trichloride and a diluent such as *o*-dichlorbenzene, toluene, xylene, dimethylaniline or chlorbenzene. The alkali metal salts of the arylides have an affinity for cotton. Examples are given.

355,333. DYES. Imperial Chemical Industries, Ltd., Millbank, London, and C. Paine, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, May 22, 1930.

A sulphonic acid of aniline or α - or β-naphthylamine or a homologue or halogen or alkoxy derivative is diazotised, coupled with a 2-alkoxy-1-naphthylamine-6- or 7-sulphonic acid, rediazotised and coupled in alkaline solution with 2 : 5 : 7-aminonaphthol-sulphonic acid, and again diazotised and coupled in acid or alkaline solution with a peri-aminonaphthol sulphonic acid or an N-substituted derivative. An example of such a dyestuff is *m*-xylidine-5-sulphonic acid (or aniline-2 : 5-disulphonic acid, metanilic acid, o-anisidine-4-sulphonic acid, 1-naphthylamine-2-sulphonic acid or 2-naphthylamine-4 : 8-disulphonic acid) → 1-amino-2-ethoxy (or methoxy)-6- or 7-sulphonic acid → 2 : 5 : 7-acid → 1-8-amino-naphthol-3 : 6- or 2 : 4-disulphonic acid or -4-sulphonic acid (alkaline coupling). The products give clear greenish-blue shades on cotton and regenerated cellulose.

355,362. ACETONE. British Celanese, Ltd., 22 Hanover Sq., London, H. F. Oxley, W. H. Groombridge and E. B. Thomas, of British Celanese, Spondon, near Derby. Application date, April 16, 1930.

Catalysts for the production of acetone, etc., from mixtures of steam with acetylene or aliphatic alcohols containing at least two carbon atoms or their esters or aldehydes, are obtained by heating a mixture of zinc oxide and an alkaline earth oxide, grinding, mixing with water, and allowing to set. A mixture of zinc and calcium oxides is heated to 1,200°-1,800° C. and a mixture of zinc oxide and magnesia to 500 ° C. An example is given.

355,380. DYES. L. Mellersh-Jackson, London From Ostro Research Laboratories, Inc., 501 West 145th Street, New York. Application date, May 28, 1930.

An alkoxy aniline is diazotised and coupled with a 1 : 3-diamino-benzene which may be substituted by 1 : 3- alkyl groups. Examples are given of the coupling of diazotised *p*-phenetidine, *p*-anisidine, *o*- phenetidine, *p*-propyl-oxyaniline, *p*-butyl-oxyaniline and *p*-isoamyl-oxyaniline with *m*-phenylene diamine.

355,413. RECOVERING VOLATILE HYDROCARBONS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30 Carel van Bylandtlaan, The Hague. International Convention date, June 29, 1929.

A condensate is recovered from gases obtained by cracking, destructive hydrogenation, or distillation, by adding a gas consisting of lower boiling substances than those to be recovered and which condense during the subsequent treatment. The added substance, *e.g.*, propane, is then removed.

355,445. PURIFYING PHENOLS. J. G. Peake, Walker Street, Rhodes, near Sydney, Australia. Application date, July 9, 1930.

Tar oils, particularly those obtained from vertical retorts and from low temperature coal distillation are subjected to heat treatment and the phenols then extracted with caustic soda. The solution is subjected to distillation at a pressure substantially less than atmospheric to remove volatile impurities. The phenols are then liberated by treating with sulphuric acid or carbon dioxide, separated and fractionated. The distillation may be effected in the presence of oxidising or reducing agents.

355,464. DYE INTERMEDIATES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 17, 1930. Addition to 264,879 (see THE CHEMICAL AGE, Vol. xvi, p. 340).

Monodiazo compounds of 1 : 4-diamino-anthraquinones substituted by halogen in the 2-position or 2- and 3-positions are obtained by diazotising these compounds; and the unstable products are then subjected to a Sandmeyer reaction. Thus, 1 : 4-diamino-2 : 3-dichloranthraquinone is diazotised and the monodiazo compound treated in aqueous alcohol with copper sulphate to obtain 1-amino-2 : 3-dichloranthraquinone or with cuprous chloride in hydrochloric acid to obtain 1-amino-2 : 3 : 4-trichloranthraquinone, or with potassium-cuprous-cyanide to obtain 1-amino-2 : 3-dichloro-4-cyanoanthraquinone, or with boiling cuprous chloride to obtain 4 : 4¹-diamino-2 : 2¹-3 : 3¹-tetrachloro-1 : 1¹-dianthraquinonyl.

354,824-5. COMPLEX ALUMINIUM SALTS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Applicate date, May 15, 1930.

354,824, Sparingly soluble fluorine compounds such as fluorspar or sodium silicofluoride are treated with aluminium chloride solution in the presence of hydrochloric acid, and under increased temperature and pressure, to obtain a solution of a complex compound having the formula $AlF_3.AlCl_3$.

354,825, A solution of the complex compound obtained above is treated with an alkali or alkaline earth carbonate or hydroxide to precipitate a basic aluminium fluoride having the formula $Al(OH)_3.AlF_3$.

354,841. ZINC OXIDE. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 17, 1930.

Zinc oxide containing 2 per cent. aluminium oxide for use in rubber vulcanisation is obtained by treating zinc chloride solution having the required addition of aluminium chloride with sodium carbonate, drying the precipitate and calcining at 400° C.

354,951. RECOVERY OF ALKALI FROM WASTE LYES. E. L. Rinman, 14 Ymervägen; Djursholm, Sweden. International Convention date, May 23, 1930. Addition to 335,371 (see THE CHEMICAL AGE, Vol. xxiii, p. 485).

Concentrated hot waste liquor from pulp manufacture is treated with oxides of barium or strontium and calcium to obtain a product which is ready for dry distillation. Examples are given of the treatment of waste liquor obtained by boiling esparto and coniferous wood.

355,016. PERPHOSPHATES. G. Schoenberg, 17 Benkenstrasse, Basle, Switzerland. International Convention date, August 10, 1929.

The mass obtained by the evaporation of hydrogen peroxide-phosphate mixtures is further dehydrated in a comminuted condition under vacuum. The products contain relatively stable phosphates.

355,055. PRESERVING FATS, FATTY ACIDS, SOAPS, ETC. Imperial Chemical Industries, Ltd., Millbank, London. International Convention date, September 10, 1929.

Auto-oxidation of fats, fatty oils or soaps is prevented by adding 0.1 per cent. of a hydroxylated diaryl compound in which the aryl residues are directly linked together, *e.g.*, *o*-or *p*-hydroxy-diphenyl, 4 : 4¹-dihydroxy-diphenyl, β-*p*-hydroxy-phenyl-naphthalene or 3 : 3¹-dihydroxy-dinaphthyl. The preservation of palm or coconut oil, swine fat, olive castile soap, lard and butter is referred to.

355,214. LUBRICATING OILS. Standard Oil Co., Whiting, N.J., U.S.A. Assignees of F. W. Sullivan, 1340 Amy Avenue, and V. Voorhees, 1265 Davis Avenue, both in Whiting, N.J., U.S.A. International Convention date, March 15, 1929.

Hydrocarbons containing not less than 30 per cent. of hydrocarbon wax are cracked in vapour form at 750°-1,100° F. and pressure up to 100 lbs. per square inch, and one or more wax free fractions up to an end point of 500° F. are agitated at 100°-250° F. in the presence of 0.5-4.0 per cent. of aluminium chloride. The oil may be neutralised with caustic soda, free from light oils and naphtha by distillation, and fractionated to obtain oils of the required viscosity. The aluminium chloride sludge is used to polymerise fresh oil.

355,223. IODIDES FROM SEAWEED. M. Mallet, 10 Rue de Milan, Paris. International Convention date, May 15, 1929.

Seaweed is extracted without agitation by alkali carbonate solution in counter current, the alginates precipitated by alcohol, and the mineral matter extracted from the liquor. A series of perforated receptacles 1, containing subdivided seaweed pass over a row of tanks C, containing alkali solution, the adjacent tanks being connected together by submerged conduits 11, 12. Liquid is drawn from the compartments and sprayed over the receptacles so that the liquid passes through the series in the opposite direction to the travel of the receptacles. Alternatively, the liquid may flow from one tank to the next over a weir, and the spraying liquid for each receptacle is drawn from the tank below it. The aqueous extract passes to tank 16, and baffle chamber 20 to which alcohol is

FIG.4

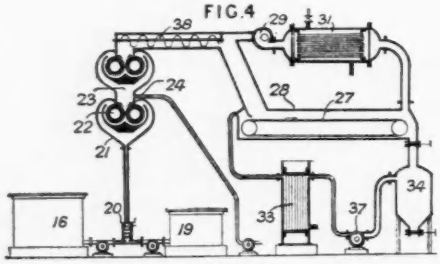
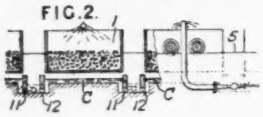


FIG.2.



355,223

also supplied from tank 19. The mixture passes to a rotary press 21 with perforated cylinders 22, and the precipitated alginate is treated with alcohol from pipe 24 and then treated in another press 23. The alcohol is recovered by distilling the liquid. The alginate is passed by conveyor 28 to a conveyor band 27, over which alcohol vapour is circulated from a heater 31 at 110° C. The dried alginate passes to chamber 34, and alcohol vapour is condensed at 33. Liquid from the press 21 is fractionally crystallised to obtain iodides and chlorides.

Specifications Accepted with Date of Application

361,338. Anthraquinone derivatives, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). June 18, 1930.

361,341. Monomolecular reaction products of unsaturated hydrocarbons of the butadiene series with sulphur dioxide. H. Studinger. July 12, 1929.

361,352. Anti-halation dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. August 16, 1929.

361,356-7. Higher paraffin hydrocarbons containing sulphur, Manufacture of conversion products of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). August 19, 1930. Additions to 24809/30.

361,378. Catalytic processes for the production of aliphatic acids and their esters. British Celanese, Ltd., and J. H. G. Plant. August 20, 1930.

361,396. Cracked petroleum oils, Purification of. R. C. Osterstrom. July 21, 1930.

361,402. Tin from its ores, Production of. H. E. Coley. August 18, 1930.

361,406. Indigoid dyestuffs of the anthraquinone series, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). August 20, 1930.

361,423. Vat dyestuffs, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). August 23, 1930.

361,443. Crude phthalic anhydride, Process of refining. W. W. Groves. (*Monsanto Chemical Works*). August 27, 1930.

361,466. Rubber, Manufacturer of. Imperial Chemical Industries, Ltd. September 27, 1929.

361,476. Methane-hydrogen mixture free from carbon monoxide, Plant for the production of—from industrial gases containing the same. H. Kemmer. September 16, 1929.

361,489. Azo-dyestuffs, Manufacture of. W. W. Groves. (*I. G. Farbenindustrie Akt.-Ges.*). September 23, 1930.

361,493. Alkamine esters of aromatic acids, Manufacture of. C. Mannich. November 1, 1929.

361,509. Sulphuric acid, Recovery of. H. Frischer. October 5, 1920.

361,518. Phosphate rock, Treatment of—and the manufacture of fertilisers. Odda Smelteverk Aktieselskap, and E. Johnson. October 11, 1929.

361,597. Dimethylol-acetone and its homologues, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). November 14, 1930.

361,605-6. Metallurgical Furnaces. New Jersey Zinc Co. January 23, 1930.

361,607. Mesityl oxide and homologues thereof, Manufacture of. Usines de Melle. December 23, 1929.

361,711. Nickel-silver-tin-copper alloys. R. Ozlberger, jun. January 23, 1930.

361,714. Fuel, Treatment of—by destructive hydrogenation. G. Zotos. February 6, 1930.

361,814. Highly active alkali coke briquettes for the production of alkali cyanides, Manufacture of—with simultaneous recovery of low-temperature carbonization products. A. Mentzel. May 14, 1930.

361,823. Sodium silicate, Manufacture of. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny, et Cirey. July 21, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Baldwin, A. W., and Davidson, A. Manufacture of benzyl ethers. 33458. December 2.

British Carbonised Fuels, Ltd., and Hird, H. P. Low-temperature carbonization of fuels &c. 33485. December 3.

British Industrial Solvents, Ltd. Fluid compositions for fluid-pressure systems. 33644. December 4.

Brocklebank, E. W., and Mitford, W. B. Distillation of materials containing hydrocarbons. 33783, 33784. December 5.

Dreyfus, H. Manufacture of oxygenated organic compounds. 33084. November 30.

—— Manufacture of aliphatic compounds. 33085. November 30.

—— Etherification of organic compounds. 33086. November 30.

—— Solutions, compositions, &c., having basis of cellulose derivatives. 33087. November 30.

—— Manufacture &c. of products having basis of cellulose derivatives. 33088. November 30.

—— Synthesis of oxygenated organic compounds. 33306. December 1.

—— Manufacture of aliphatic compounds. 33520. December 3.

Du Pont de Nemours & Co., E. I. Coating fabrics. 33543. December 3. (United States, December 3, '30.)

Groves, W. W. (*I. G. Farbenindustrie Akt.-Ges.*). Manufacture of arylamino-2-hydroxy-naphthalene-carboxylic acids. 33454. December 2.

—— Manufacture of hydroxy-benzo-quinoline carboxylic acids. 33532. December 3.

I. G. Farbenindustrie Akt.-Ges. Manufacture of 1-alkoxy-2-acylaminobenzene-arsonic acids. 33181. November 30. (Germany, November 29, '30.)

—— Sizing textile fibres. 33183. November 30. (Germany, November 29, '30.)

—— Manufacture of dyestuff preparations. 33455. December 2. (Germany, December 2, '30.)

Imperial Chemical Industries, Ltd., Lodge, F., and Lumsden, C. H. Dyestuffs. 33456. December 2.

—— Manufacture of composite masses. 33457. December 2.

—— Manufacture of benzyl ethers. 33458. December 2.

—— Separation of ethylene from its homologues. 33459. December 2.

—— Refrigerating. 33684. December 2.

Johnson, J. Y. (*I. G. Farbenindustrie Akt.-Ges.*). Apparatus for causing liquids to react with gases or vapours. 33094. November 30.

—— Johnson, J. Y. Manufacture of wetting-agents. 33521. December 3.

Leese, L. F. W. Recovery of sulphur. 33266. December 1.

Lenander, N. E. Refining sulphur. 33346. December 1.

Mentzel, A. Simultaneous production of methane, ammonia and alkali, &c. earth carbonate. 333244. December 1. (Germany, December 23, '30.)

—— Absorption of nitrogenous gases mixed with oxygen or air. 33411. December 2. (Germany, January 16.)

Morton, A. Home- (*Hoffmann-La Roche and Co., Akt.-Ges.*). Manufacture of stable concentrated solutions for therapeutic use. 33710. December 4.

Schering-Kahlbaum Akt.-Ges. Manufacture of N-alkyl di-iodo chelidamic acids. 33155. November 30. (Germany, December 18, '30.)

Soc. of Chemical Industry in Basle. Manufacture of azo dystuffs. 33323. December 1. (Switzerland, December 1, '30.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° TW.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8d. per lb., d/d U.K.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £14 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9½d. to 10d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 per ton d/d U.K.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅝d. per lb. net d/d U.K., discount according to quantity; ground 5½d. per lb.
POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—5½d. per lb. d/d U.K.
SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—3¾d. per lb. net d/d U.K., discount according to quantity. Anhydrous 4⅝d. per lb.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3¾d. per lb. d/d U.K.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£15 per ton, f.o.r. London, casks free.
SODIUM SILICATE., 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6¼d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.
ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.
TOLUOLE.—90%, 2s. per gall. Pure, 2s. 3d. per gall.
XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.
CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.
PITCH.—Medium soft, 70s. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 4s. to 4s. 6d. per gall. 90/180, 2s. to 2s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—7¾d. per lb.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.
B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.
NITRONAPHTHALENE.—8¾d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—£7 5s. to £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gall.
ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—80s. to 90s. per cwt.
CHARCOAL.—£6 to £9 per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
METHYL ACETONE, 40/50%.—£48 per ton.
RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
WOOD CREOSOTE.—1s. to 2s. 6d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gall. Solvent, 3s. 6d. to 4s. 6d. per gall.
WOOD TAR.—£2 to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.
BABYTES.—£7 to £8 10s. per ton, according to quality.
CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON, BLACK.—4d. to 5d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.
LAMP BLACK.—£46 to £50 per ton.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£12 5s. to £15 15s. per ton.
MINERAL RUBBER "RUPRON."—£18 10s.
PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.; P.T.D., 9s. 8d. to 10s. 4d. per lb.; C.P.D., 8s. 3d. to 8s. 10d. per lb.; S.P.D., 8s. 1d. to 8s. 7d. per lb.; Suparac, Standard, 7s. per lb.; Suparac, Z, 3s. 6d. per lb.
SULPHUR CHLORIDE.—4d. to 7d. per lb., according to quality.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
SULPHUR PRECIP. COMMERCIAL.—£50 to £55 per ton.
VERMILLION, PALE OR DEEP.—6s. 11d. to 7s. 1d. per lb.
ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 5d. per lb.

ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.

ACID, BENZOIC B.P.—1s. 10d. per lb., for 1-cwt. lots. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 0¾d. per lb., less 5%.

ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 1d. per lb., less 5%.

AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.

AMMONIUM BENZOATE.—3s. 6d. per lb.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.

BARBITONE.—9s. 6d. to 10s. 6d. per lb.

BENZONAPHTHOL.—3s. 6d. per lb.

BISMUTH CARBONATE.—8s. 4d. per lb.

BISMUTH CITRATE.—9s. 10d. per lb.

BISMUTH SALICYLATE.—8s. 4d. per lb.

BISMUTH SUBNITRATE.—6s 11d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 5d. per lb.

BISMUTH OXIDE.—11s. 11d. per lb.

BISMUTH SUBCHLORIDE.—11s. 6d. per lb.

BISMUTH SUBGALLATE.—7s. 10d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W.Qts. 1s. 2½d. per lb.; 6 W. Qts. 1s. per lb.; 12 W. Qts. 10½d. per lb.; 36 W. Qts. 10d. per lb. Liquor Bismuth B.P., in W. Qts. 1s. 2½d. per lb.; 6 W. Qts., 1s. per lb.; 12 W. Qts., 10½d. per lb.; 36 W. Qts., 10d. per lb.

BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES, B.P.—Ammonium, 1s. 8d. per lb.; potassium, 1s. 5d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.

CAFFEIN, PURE.—6s. 6d. per lb.

CAFFEIN CITRAS.—5s. per lb.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 4d. per lb., according to quantity.

CAMPHOR.—Refined flowers, 3s. 5d. to 3s. 7d. per lb., transparent tablets, 3s. 8d. to 3s. 10d., according to quantity; also special contract prices.

CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.

CHLOROFORM.—2s. 4d. per lb.

ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.

GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.

HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.

HYDROQUINONE.—4s. 2d. to 4s. 6d. per lb.

HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.

IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz.

MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.

MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 15s. 9d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.

MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 5d. to 8s. 6d. per lb., levig 7s. 11d. to 8s. per lb.; Corrosive Sublimate, Lump, 6s. 2d. to 6s. 3d. per lb., Powder, 5s. 8d. to 5s. 9d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb.; Powder, 6s. 11d. to 7s. per lb.; Calomel, 7s. to 7s. 1d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 8d. to 6s. 9d. per lb.; Sulph. nig., 6s. 3d. to 6s. 4d. per lb. Special prices for larger quantities.

METYL SALICYLATE.—1s. 4½d. to 1s. 6½d. per lb.

PARAFORMALDEHYDE.—1s. 6d. per lb.

PARALDEHYDE.—1s. 1d. per lb.

PHENACETIN.—4s. 4d. to 4s. 6d. per lb.

PHENOLPHTHALEIN.—4s. 4d. to 4s. 6d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—98s. 6d. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.

POTASSIUM IODIDE.—B.P., 24s. 6d. to 27s. 6d. per lb., as to quantity.

POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.

POTASSIUM PERMANGANATE.—B.P. 7d. per lb. for ton lots.

QUININE SULPHATE.—2s. 6d. per oz., for 100-oz. tins, tins free.

SACCHARIN.—43s. 6d. per lb.

SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.

SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.

SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.

SODIUM BENZOATE B.P.—1s. 7d. per lb.

SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.

STRYCHNINE, ALKALOID CRYSTAL, 2s. 7½d. per oz.; hydrochloride, 2s. 4d. per oz.; nitrate, 2s. 2½d. per oz.; sulphate, 2s. 3½d. per oz., for 1,000-oz. quantities.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.

ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—8s. 9d. per lb.

AMYL ACETATE.—2s. 3d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—9s. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—3s. per lb.

BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 2d. per lb.

CINNAMIC ALDEHYDE NATURAL.—12s. 6d. per lb.

COUMARIN.—14s. per lb.

CITRONELLOL.—9s. per lb.

CITRAL.—6s. 6d. per lb.

ETHYL CINNAMATE.—10s. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—7s. 6d. per lb.

GERANIOL.—7s. 3d. to 12s. per lb.

GERANIOL (FROM PALMAROSA).—17s. 3d. per lb.

HELIOTROPINE.—6s. per lb.

ISO EUGENOL.—9s. 6d. per lb.

LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.

LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.

METHY ANTHRANILATE.—7s. 6d. per lb.

METHYL BENZOATE.—4s. 3d. per lb.

MUSE XYLOL.—6s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. per lb.

PHENYL ETHYL ALCOHOL.—8s. 6d. per lb.

RHODINOL.—44s. per lb.

SAFROL.—2s. per lb.

VANILLIN, EX CLOVE OIL.—16s. to 18s. per lb. Ex Guaiacol.—14s. 3d. to 16s. 3d. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.

BERGAMOT OIL.—12s. per lb.

CAMPHOR OIL.—Brown, 110s. per cwt.; White, 110s. per cwt.

CINNAMON OIL LEAF.—4s. 3d. per oz.

CITRONELLA OIL.—Java, 2s. 10d. per lb., c.i.f. Pure Ceylon, 2s. 3d. per lb.

CLOVE OIL, 90/92%.—5s. 6d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 12s. per lb.

LEMON OIL.—5s. per lb.

ORANGE, SWEET.—7s. 9d. per lb.

PALMA ROSA.—9s. per lb.

PEPPERMINT.—English Mitcham, 52s. 6d. per lb.; Wayne County, 9s. 9d. per lb.; Japanese, 5s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, December 10, 1931.

A SUBSTANTIAL volume of business has been placed during the current week with prices of practically every product tending towards a higher level. With the further fall in sterling business is a matter of negotiation as prices are more or less nominal.

ACETONE.—A substantial advance in prices has been made and the market is firm at £65 to £68 per ton. There is an active demand for early delivery.

ACID, ACETIC.—The market is very firm at the advanced prices of £37 5s. to £39 5s. for Technical 80% and £38 5s. to £40s 5d. for the Pure 80% with a very steady demand.

ACID, BORIC.—A further advance of £1 10s. is reported with conditions very firm.

ACID, CITRIC.—Whilst the market is maintained at about 1s. 0½d. per lb. less 5%, the demand is inclined to ease.

ACID, FORMIC.—Is quoted higher at £50 per ton with supplies short for early delivery and the position is very firm.

ACID, OXALIC.—Is quoted at £50 per ton with a brisk demand and conditions very firm.

ACID, TARTARIC.—More demand has been received with the market firm at 1s. 1d. per lb.

ALUMINA SULPHATE.—Continues in active demand at about £8 10s. to £9 10s. per ton.

AMMONIUM CHLORIDE.—The market has advanced to £19 for Fine White Crystals with a brisk demand.

ARSENIC.—Cornish material is unavailable and the market is nominal at about £28 per ton. Imported material is on offer at £24 to £26 per ton c.i.f. U.K. Ports.

BARIUM CHLORIDE.—Continues in brisk request with conditions firm at about £11 per ton.

BORAX.—A further increase of £1 per ton is reported with the position firm.

CREAM OF TARTAR.—The market continues firm at 87s. 6d. to 89s. 6d. per cwt. less 2½% with an increasing demand.

FORMALDEHYDE.—Conditions are firm with the market receiving a brisk inquiry and quoting at about £30 per ton.

LEAD ACETATE.—A substantial increase is reported in prices. White quoted at about £41 to £42 per ton with Brown £1 per ton less.

LITHOPONE.—Steady and in good demand at about £22 per ton.

POTASSIUM BICHROMATE.—The market is nominal at 4½d. nett with orders only being accepted for early delivery.

POTASSIUM CHLORATE.—There has been a fair demand with the market firm at about £32 to £34 per ton.

POTASSIUM PERMANGANATE.—Needle Crystals B.P. in good demand at about 7¾d. to 8d. per lb.

POTASSIUM PRUSSIATE.—The market continues active with prices firm at about 8½d. per lb.

SODIUM ACETATE.—Small quantities are available at about £23 per ton with the market ruling very firm.

SODIUM BICHROMATE.—Prices are increased to 3¾d. per lb. nett with orders only being acceptable for early delivery. There is an active demand.

SODIUM CHLORATE.—In good request with the market firm at about £30 per ton.

SODIUM NITRITE.—Quoted higher at about £22 to £22 10s. per ton with a fairly good demand.

SODIUM PRUSSIATE.—Prices are advanced to 5d. to 5½d. per lb. and there is a fair demand.

SODIUM SULPHIDE.—Contracts are now being booked for delivery during the first half of next year showing an increase of 10s. per ton on current prices.

ZINC SULPHATE.—In good demand at about £12 per ton.

Coal Tar Products

THE coal tar products market is unchanged from last week, and prices are quoted as follows:—

MOTOR BENZOL.—Remains at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon f.o.r

HEAVY NAPHTHA.—Quoted at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Obtainable at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Unchanged, at about 1s. 6d. per gallon f.o.r. for 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Remain at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Quoted at about 65s. to 67s. 6d. per ton, f.o.b. East Coast Port.

Latest Oil Prices

LONDON, December 9.—LINSEED OIL was steady. Spot, ex mill, £16 10s.; December, £14 5s.; January-April, £15 7s. 6d.; May-August, £17; and September-December, £18, naked. RAPE OIL was inactive. Crude extracted, £30 10s.; technical, refined, £32 10s., naked, ex wharf. COTTON OIL was dull. Egyptian, crude, £19 10s.; refined common edible, £23 10s.; and deodorised, £25 10s. naked, ex mill. TURPENTINE was quiet. American, spot, 52s. 9d.; January-April, 53s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot closed at £15 5s.; December at £15 5s.; January-April at £15 10s.; and May-August at £16 17s. 6d. per ton, naked. COTTON OIL.—Egyptian crude, spot, £19; edible refined, spot, £21 10s.; technical, spot, £21 10s.; deodorised, £23 10s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £24 per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £28 10s.; deodorised, £32 10s. SOYA OIL.—Crushed/extracted, spot, £20 10s.; deodorised, £24. RAPE OIL.—Crushed/extracted, spot, £29; refined, £31 per ton. COD OIL, 16s. 6d. per cwt. TURPENTINE.—American, spot, 55s. per cwt. CASTOR OIL.—Pharmacy, spot, 40s. 6d.; first, 41s. 6d.; second, 39s. 9d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The market for sulphate of ammonia is very quiet and transactions are small. The price remains unchanged at £5 5s. per ton f.o.b. U.K. port in single bags. *Home.*—It is understood that as a great number of merchants and farmers have covered their requirements for the spring, only a small amount of purchases is being made. The price of £6 15s. per ton delivered in 6-ton lots to consumer's nearest station remains unchanged.

IMPORTED NITRATE OF SODA.—Although during October a considerable tonnage was imported into the U.K., it is understood that up to the present a considerable quantity of this remains unsold.

BRITISH NITRATE OF SODA.—It is reported that small quantities have been booked for spring delivery.

NITRO-CHALK.—It is believed that small sales are being made continually for delivery during the spring, and the fact that this product is being sold at lower prices than other nitric fertilisers will result in a considerable increase of consumption.

South Wales By-Products

THERE is very little change in South Wales by-product activities. Business generally is slow and uncertain. The call for pitch continues to be confined to small, prompt parcels, and it is noteworthy that most of the buying is done by patent fuel makers. There is no change in values. Road tar has a moderate call round about 13s. per 40-gallon barrel. Refined tars are a fair feature, there being a steady, if moderate, call for gasworks and coke oven tar. There is no change in prices. Naphthas remain quiet. Solvent has a small demand, but heavy has practically no call. Creosote remains weak, but motor benzol remains a good feature. Patent fuel and coke exports show no improvement. Patent fuel prices, for export, are:—19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d., ex-ship Swansea. Coke prices are:—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 16s. to 17s. 6d.

Scottish Coal Tar Products

THE recent spurt in business has proved to be of a temporary nature. Orders are again rather scarce although distillers are in quite a comfortable posiion, having disposed of their stocks of most products.

CRESYLIC ACID.—Remains uninteresting with values easier. Pale, 99/100 per cent., 1s. 4d. to 1s. 5d. per gallon; pale, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; dark, 97/99 per cent., 1s. 1d. to 1s. 2d. per gallon; all f.o.r. makers' works. High Boiling Acid is unchanged at 2s. 6d. to 3s. per gallon.

CREOSOTE OIL.—Consumers are finding temporary difficulty in securing prompt supplies of best grades. Prices are steady as follows:—Specification oils, 2½d. to 3d. per gallon; washed oil, 3¼d. to 3½d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon all ex makers' works in bulk.

COAL TAR PITCH.—Inquiries are fairly numerous for export but supplies are scarce. Value is purely nominal at 57s. 6d. to 62s. 6d. per ton f.o.b. Glasgow. Home market continues to look after present production and quotations are at 60s. per ton ex works.

REFINED COAL TAR.—The upward tendency has been checked by English competition. Value is not more than 4d. per gallon at makers' works in buyers' packages, but quotations are somewhat higher.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, December 9, 1931.

THERE has been renewed activity in the Scottish heavy chemical market during the past week, inquiries for home consumption being numerous and export inquiries brisk.

ACETONE.—B.G.S.—In good demand quoted £65 to £68 per ton ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £48 to £59 per ton; pure, 80%, £38 5s. per ton; technical, 80%, £37 5s. delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. to 1s. 0½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted at £9 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £33 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £25 10s. per ton, ex wharf. Spot material still on offer at £26 per ton, ex store.

BARIUM CHLORIDE.—Price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £40 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £35 to £36 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—96% to 98%. In fair demand. Spot material on offer, £28 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% Powder.—Quoted £34 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 7d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £13 per ton; roll, £11 10s. per ton; rock, £10 5s. per ton; ground American, £9 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

A Revised Index to Chemical Periodicals

OUR American contemporary, *Chemical Abstracts,* has undertaken to help bridge the gap between abstracts and original papers by providing a new "list of periodicals abstracted," containing information which should make it possible for any chemist anywhere to get almost any paper with a minimum of effort. The last printed list appeared in 1926. The new list, thoroughly revised, appeared as a part of the November 20 number of *Chemical Abstracts.* Reprints are available at 50 cents each. The new list contains 3100 entries, 1993 of which represent periodicals of chemical interest now appearing. The 1107 other entries are for discontinued periodicals, name changes, transliterated names (mostly Japanese and Russian), and names of sponsoring institutions. Many of the periodicals listed are of course not strictly chemical publications, but each can be counted on to contain at least occasional papers of scientific or technical interest to chemists. All are examined systematically in the production of *Chemical Abstracts.* The considerable increase in the number of periodicals listed (from 1246 in 1926) is to be accounted for by the appearance of many new journals, estimated recently as a new one of chemical interest every two weeks; the recent tendency for periodicals to be split up into more or less distinct parts; the unearthing of a considerable number of obscure publications appearing in Japan, Hungary, Italy, Poland, Scandinavia, etc.; and the entering of a number of irregular publications not previously counted as periodicals. New scientific periodicals have been appearing in Russia with a frequency that is particularly noticeable.

Tests on Petroleum Products and Lubricants

THE American Society for Testing Materials has issued the annual report of its Committee D-2 on Petroleum Products and Lubricants, together with the reports of several sub-committees. The book comprises 267 pages and includes thirty-three standard methods of test and fourteen tentative test methods for products in this field. Standard methods of test are included for the determination of bitumen, burning quality of kerosene oils and of mineral seal oils, carbon residue of petroleum products, cloud and pour points, and colour of lubricating oils, petrolatum, and refined petroleum oil. Tests for the dilution of crankcase oils, distillation of crude petroleum, gasoline, naphtha, etc., flash points, gravity by means of the hydrometer, and the analysis of grease are also given. The price of this book is $1.25. It can be obtained from A.S.T.M. Headquarters, 1315 Spruce Street, Philadelphia, Pa., U.S.A.

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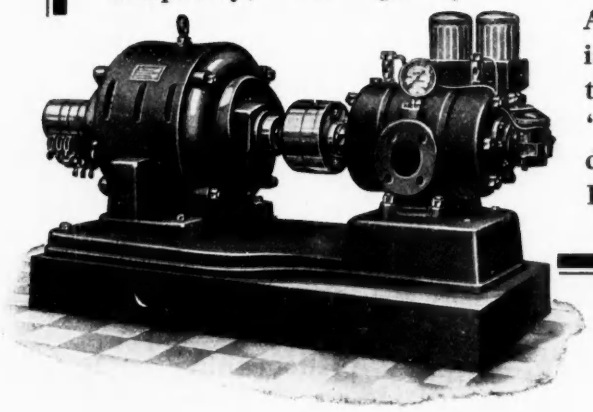

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Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, December 9, 1931.

Although marked firmness, with prospects of further rises to come, is a continued feature of the chemical market here, the position from the point of view of imported materials, as the result almost entirely of the uncertainty of the exchange position, is decidedly unsettling and trading difficulties in this section are increasing rather than diminishing. A consequence is that a good deal of caution is being displayed by buyers. Business during the past week has been only on a moderate scale, with the bulk of the transactions, pending the issue of contract prices for next year, relating to near delivery dates.

Heavy Chemicals

Yellow prussiate of soda meets with a quietly steady demand on this market and offers are very firm at the recent advance of from 5d. to 6d. per lb., according to quantity and quality. There is a moderate movement of bicarbonate of soda, current quotations for which are at round £10 10s. per ton. Caustic soda is firm and in fair request, with prices ranging from £12 15s. to £14 per ton, in contracts and according to quality. Saltcake is well held at about £3 per ton, although business this week has been rather restricted. There has been little change in the general position of phosphate of soda, the demand being quiet with offers of the dibasic material at up to £13 per ton. Chlorate of soda is being quoted at from about £29 to £30 per ton, with buying interest at the moment on quiet lines. Bichromate of soda meets with a moderate volume of inquiry and quotations in this section are well held on the basis of 3½d. per lb. Hyposulphite of soda continues steady, with the photographic grade ranging from about £15 to £15 10s. per ton and the commercial material at round £9 5s. Alkali is moving off in fair quantities and quotations are fully maintained at £6 per ton. With regard to sulphide of sodium, only a quiet business is being put through, but offers in this sections are firm at the higher rates of £11 10s. per ton for the 60-62 per cent. concentrated solid quality, with the commercial grade quoted at £9 5s., both in ton lots.

Conditions are not too active in respect of the majority of the potash products, but values keep very firm in most sections. Permanganate is being quoted at up to 6¾d. per lb. for the B.P. material, and about 6½d. for the commercial. There has been no alteration in the position of yellow prussiate of potash; only a moderate buying movement is reported but at about 8½d. per lb., values are well held. Bichromate of potash is in quietly steady demand on the basis of 5½d. per lb., with chlorate selling at round £34 per ton. With regard to caustic potash, this meets with rather a slow inquiry at the moment at from £38 to £39 per ton. Carbonate of potash is steady, current offers in this section being at about £28 10s. per ton.

The demand for sulphate of copper during the past week has been rather limited, but at £18 per ton, f.o.b., prices show little change. Arsenic is still in exceedingly short supply, with white powdered, Cornish makes, nominal at about £26 per ton, at the mines, and imported kinds at from £23 10s. to £24 per ton, ex store. The recent heavy advance in the acetates of lead is maintained, with the white material at about £44 per ton and the brown at £43. Nitrate of lead is quoted at £29 per ton. The acetates of lime are in slow demand at £10 10s. to £11 per ton for the grey and £7 for the brown.

Acids and Tar Products

Among the acids, oxalic is firmer at about £2 10s. per cwt., ex store. Citric acid is in quiet request, with values about unchanged at 1s. 1½d. per lb., tartaric being a shade dearer again at from 1s. 1¼d. to 1s. 1½d. per lb. Acetic acid meets with a moderate inquiry, with the 80 per cent. commercial products at £39 5s. per ton, and the technical glacial at £52.

Offers of pitch this week range from about 60s. to 62s. 6d. per ton, f.o.b., with business on a moderate scale. Creosote is not particularly active at the moment but prices keep up at from 3½d. to 4⅜d. per gallon, naked, according to quality. Solvent naphtha is steady and in fair inquiry at about 1s. 3¾d. per gallon.

Company News

W. and H. M. Goulding.—An interim dividend of 3 per cent., less tax, has been declared on the ordinary shares, payable on December 31.

Bleachers' Association, Ltd.—At a meeting in Manchester on December 4, the directors decided not to pay any interim dividend on the ordinary shares for the year ending March 31 next.

United Molasses Co., Ltd.—The directors announce that in view of the position as outlined in the interim report issued to shareholders in September, payment of the preference dividend, due on December 15, 1931, will not be made.

British Tar Products.—A profit of £40,499 is reported for the year to September 30 last. A dividend of 5 per cent. making 10 per cent. for the year, and a bonus of 2½ per cent. have been declared on the ordinary and preferred ordinary shares, making 12½ per cent. for the year.

British Benzol and Coal Distillation Co.—The trading results for the year to October 31, 1931, show a loss of £19,215, against a profit of £6,433 last year. After charging overhead expenses, bank interest, etc., and allowing £9,699 for depreciation, the loss for the year is £36,832. This, together with a debit balance brought forward, makes a total debit balance at profit and loss of £40,042.

United Africa Company.—A loss of £1,238,122 is reported for the year to April 30 last. The directors of Lever Brothers state that the proportion of the above-mentioned loss accruing to them through the Niger Company has been fully provided for out of revenue, and that, notwithstanding such provision, the profits of Lever Brothers for the year 1931 will be in excess of those for 1930.

Joseph Nathan and Co., Ltd.—The directors announce that cabled and preliminary information indicates that the net profit for the year to September 30 last, subject to audit, will amount to £52,137, as compared with £68,066 last year. The accounts will be issued in March, when the annual meeting will be held, at which the payment of the usual dividend on the 8 per cent. preferred ordinary shares will be recommended. Warrants for the half-yearly dividend on the 7 per cent. preference shares will be posted on December 31.

Acetate and Acetate Products (Foreign Rights).—The report for 1930 states that owing to general trade conditions it has not been found possible to effect the sale of the company's patents and processes. Rent of offices, salaries, consultant's fees, etc., absorbed £1,946; add legal charges, etc., £249, patent fees £31, making £2,226. After deducting refund of patent expenses £2,100, interest received £6, there remains a net loss carried to balance-sheet of £120; add debit balance brought forward £8,837, making total debit balance of £8,957 to be carried forward.

Low Temperature Carbonisation, Ltd.—The report for the year ended October 31, 1931, states that the 8 per cent. prior lien debenture stock was due for redemption on July 1, 1931, but at a meeting of the stockholders held on June 10, it was resolved to postpone redemption date to July 1, 1936. Trading account shows sales and revenue for the year of £194,811, as compared with £76,549 last year, and credit balance of £25,129, which, together with interest received (mainly in respect of company's holding of Debentures in Doncaster Coalite, Ltd.), brings the total to £34,263. After providing for head office, technical and sales department expenses, there remains a credit balance of £17,730.

Anthocyanins

To the Editor of The Chemical Age.

Sir,—Attention must be drawn to the contribution by Professor and Mrs. R. Robinson in the present issue of *The Biochemical Journal* (p. 1687). The technique elaborated by them for the study of the anthocyanins eliminates the necessity for "the collection of kilogrammes of dried petals," and does not even require the isolation of the pigments for identification. These methods have in consequence the advantage of "more rapid" production of results, apparently desired in some quarters.—Yours etc.,

Chymistus Scepticus.

Tariff Changes

SWEDEN.—In virtue of a Royal Decree, dated June 12 and effective as from August 1, acetyl-dimethyl-dihydro-thebaine has been added to the list of drugs, the exportation, importation, manufacture, possession and sale of which are subject to restriction.

SOUTH AFRICA.—A Government notice published on October 16, notifies that the Minister of Public Health has amended the regulations issued under the Foods, Drugs and Disinfectants Act so as to prohibit entirely in the Union of South Africa the use of saccharine as a sweetening agent in aerated or mineral waters, with effect from December 31 next.

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to January 2, 1932.

CLEANIX.

520,401. Class 1.—Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Clensol, Ltd., 75 Victoria Street, Westminster, London, S.W.1; manufacturers.—October 15, 1931.

MEMBRANIT.

524,715. Class 1.—Lacquers, varnishes, and aqueous emulsions of resinlike chemical substances, for use in the manufacture of lacquers and varnishes. I. G. Farbenindustrie Aktiengesellschaft (a Joint Stock Company organised under the laws of Germany), Mainzerlandstrasse 28, Frankfort-on-Main, Germany; manufacturers.—July 30, 1931.

FULLACINE.

526,046. Class 1.—Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Society of Chemical Industry in Basle (a Joint Stock Company organised under the laws of Switzerland), 141 to 227 Klybeckstrasse, Basle, Switzerland; manufacturers and Merchants.—October 26, 1931.

ANODITE.

526,931. Class 1.—Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Goodlass Wall and Co., Ltd., 42 Seel Street, Liverpool; paint, colour and varnish manufacturers.—November 6, 1931.

GLYCO-IZAL.

526,707. Class 2.—Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. Newton, Chambers and Co., Ltd., Thorncliffe Ironworks and Collieries, near Sheffield; manufacturers.—October 28, 1931.

"DOUBLE RING" BRAND.

525,996. Class 2.—Chemical fumigants. Trenman Agencies, Ltd., Radnor House, 93 Regent Street, London, W.1; merchants.—September 29, 1931.

New Companies Registered

HIGH TEST MOTOR OILS, LTD. Registered December 2. Nominal capital £1,000 in £1 shares. Manufacturers of and dealers in oils, libricants, greases, tallow, petrol, paraffin, benzol, motor spirits, tar, bitumen, petroleum, wax, beeswax, oilfuels and liquid and solid fuels of all descriptions, etc. A subscriber: J. J. Eccles, "Mostyn," Whitebirk, Blackburn.

IRISH CHEMICALS, LTD, 2 Garfield Chambers, 44 Royal Avenue, Belfast. Registered in Belfast on December 1. Nominal capital £3,000 in £1 shares. Chemical manufacturers, dealers in chemical substances, etc. Directors: L. T. Montgomery, F. C. Hopkirk.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

SOUTH AFRICA.—The City Council of Johannesburg is calling for tenders to be presented in South Africa by January 11, 1932, for the supply of 4,250 tons (each 2,000 lbs. net) of tar or tar substitute. (Ref. B.X. 7204.)

UNITED STATES.—A firm in New York wish to purchase industrial chemicals, intermediates, dyestuffs, tanning materials, on their own account and/or consignment, or on commission. (Ref. No. 675.)

CUBA.—A firm in Havana desire to represent United Kingdom firms for the sale of pea-nut, palm and coco-nut oils. (Ref. No. 679.)

Scottish Amalgamated Silks, Ltd.

Statement on First Year of Liquidation

NO repayment is possible for the holders of the deferred capital, which amounts to about £500,000 in 1s. shares, in Scottish Amalgamated Silks, Ltd., which is in liquidation. This information was conveyed to shareholders who met in Glasgow on Thursday, December 3, to hear the statement of the joint liquidators, Mr. Scott Adamson and Mr. H. Sharp, on the first year of liquidation.

In their statement the liquidators said that at the date of liquidation the company possessed Poolstock Mill, Wigan, which cost £55,000; Dalmarnock and River Street Works, Glasgow, which cost £65,000; and Argyll Works, Alexandria, which cost £105,000. The Scottish Artificial Silks, an associated company, possessed Providence Mill, Cheshire, which cost £47,500; Tongland Mill, Kirkcudbright, costing £40,000; and Wenning Mill, Lancs, costing £7,500. Two of the properties, Poolstock and Wenning Mills, had been disposed of during liquidation. For Poolstock Mill £5,500 was received. Wenning Mill was disposed of as a going concern, the result of trading operations having shown a profit of approximately £2,500. A good amount of stock was taken over by the purchasers, the total consideration being £19,425. The liquidators said the realisation of the Amalgamated Silks Company totalled £39,500, which, after payments to preference creditors, etc., left a balance of £25,331 in cash. For the Artificial Silks Company the balance in cash and securities was £32,868.

Cosach Inquiry

Report of New Expert Commission

DISSOLUTION of the Cosach nitrate combine is said to be recommended by the report of the New Chilean Government Commission only if the private nitrate companies refuse to accept certain reforms suggested for the revival of prosperity in the industry. The new report will not be published for several days, but this is reported to be the gist of its recommendations, according to the Santiago re Chile correspondent of the Associated Press.

Following attacks made on the combine a commission was set up to inquire into it, which recommended dissolution. A further examination of the report by technical experts was ordered, and it is their conclusions which now await publication.

Bengal Drug and Chemical Trade

THE total imports of drugs into Bengal in 1930-31 amounted in value to Rs. 66 lakhs as against Rs. 77 lakhs in the previous year. The imports of chemicals also declined from Rs. 115 lakhs to Rs. 100 lakhs. The United Kingdom retained her premier position as the chief supplier, being responsible for 51 per cent. of the total imports. Trade in synthetic camphor from Germany and Switzerland and in caustic soda from the United Kingdom showed an increase. Development of the local industry in indigenous drugs and proprietary medicines is accountable for the decline under "drugs and medicines, other sorts." With the exception of a slight improvement in imports of caustic soda, bleaching materials and alum, a big drop is noticeable in all heavy chemicals.